

PLANTS OF COAHUILA, EASTERN CHIHUAHUA, AND ADJOINING ZACATECAS AND DURANGO, I

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IN this, the first of a projected series of papers, I begin an enumeration and analysis of the vascular flora found on the great arid plateau lying between the Eastern and Western Sierra Madre of northern Mexico. Predominantly a region of Cretaceous calcareous rocks, it contains many broad silty valleys, most of them bolsons, with extensive areas of desert scrub dominated by *Larrea* and *Flourensia*, and many scattered limestone mountain ranges, some of which support oak-chaparral on the higher ridges and in their upper canyons, and a few of which are lofty enough for the development of small coniferous forests. Igneous rocks, scattered and local in the eastern half of the plateau, increase in abundance and frequency toward the base of the predominantly igneous Western Sierra Madre and prevail in large areas in eastern Chihuahua, where grasslands and grassy hills with liveoaks are the characteristic types of vegetation.

The western limit of the region studied extends, roughly, from the area about Lake Guzman, in northwestern Chihuahua, southeast to near Chihuahua City and then southward in an irregular line west of Camargo and Jimenez to include the northern and eastern parts of the State of Chihuahua. Continuing southward, the limit passes west of Mapimi and Torreon to include the northeastern portions of the State of Durango. As the eastern limits of the area, I have followed the eastern boundary of the State of Coahuila. This includes parts of extreme eastern and northeastern Coahuila which are not parts of the plateau. Since, however, the few collections available from these districts represent a flora which, in large part, has extended up onto the plateau in the east-central parts of Coahuila, it has seemed practical and interesting to include in the catalogue, at least, records of all the collections available from the entire State of Coahuila.

The southern boundary is indefinite; in practice it roughly follows the latitude of the southeastern portion of the State of Coahuila. This includes in our area the northern portions of the State of Zacatecas. The northern limit follows the international boundary. Although the eastern and western limits of the areas studied are roughly natural, the northern and southern limits are not so. The plateau flora treated continues northward from our area into southern New Mexico and into trans-Pecos Texas, with many of its characteristic species reaching southeastern Arizona and the Edwards Plateau and its escarpments in Texas. The Rio Grande is not a floristic boundary. Floristically the Big Bend area of Texas and the mountains along the Rio Grande to the northwest of it have the closest of relations with the area south of the river. Because of the paucity of col-

lections made about our southern limits, little can be said regarding the details of species-distribution in that region. It is clear, however, that a great many species of our area extend south into the extensive desert tracts of northern San Luis Potosi. A goodly number reach their southern limits in the dry valleys of northwestern Hidalgo and some even on the arid plateau of central Mexico, in western Vera Cruz and adjacent Hidalgo and Puebla.

In publishing the present enumeration of species I am under no illusion that it approaches a nearly complete listing of all the species actually growing in the area. I shall, in fact, be surprised if it includes seventy-five percent of the total vascular flora. However, it will be vastly more complete and very much more detailed than Watson's enumeration of Edward Palmer's collections, *Proc. Am. Acad.* **17**: 316-361 (1882) and **18**: 96-191 (1883), published sixty years ago, the only listing of the flora to date. The present catalogue is based almost exclusively upon collections available at the Arnold Arboretum and the Gray Herbarium, particularly the latter. These include such classical collections as those of Berlandier, Gregg, Palmer, Pringle, and Purpus, and the less widely distributed recent collections from the area by L. H. Harvey, Harde LeSueur, E. G. Marsh Jr., C. H. Muller, Forrest Shreve, Stephen S. White, F. L. Wynd, F. L. Wynd & C. H. Mueller, and L. R. Stanford, K. L. Retherford & R. D. Northcraft. Reported upon also are the extensive collections made since 1941 by Mr. Robert Stewart in Coahuila and Chihuahua and those made in Coahuila and Chihuahua by Dr. C. H. Muller and me in 1940, and by me alone in 1941. Collections available from the area probably total well over 15,000 specimens. They do not represent, however, a satisfactory sampling of the flora of the whole area. There are available few if any collections from the Laguna District, the valleys of the Rio Florida, Rio Conchos, and Rio Grande, or from that very promising but unexplored large tract of desert country west of Ojinaga and east of the El Paso-Chihuahua City highway. The majority of the species missing from this catalogue will be discovered in these districts. It is recognized that the present catalogue can be only an incomplete preliminary one. I believe, however, that it will be adequate as a basis for a general discussion of the composition and origins of the flora. These general subjects, as well as matters regarding the geography and geology of the terrain, floristic areas, major plant-associations, collectors' itineraries, etc. will be covered in the concluding numbers of this series of papers.

My work on the flora of the intermontane plateau of northern Mexico has been carried on in close cooperation with Dr. Forrest Shreve, of the Desert Laboratory of the Carnegie Institution. One of the objectives of the present catalogue is to supply taxonomic and phytogeographical data for the detailed ecological survey of the intermontane plateau deserts of northern Mexico and adjacent United States being prepared by Dr. Shreve. In furtherance of the work I have had three seasons of field work in the area, in 1938, 1940, and 1941, financed by the Carnegie Institution and the Arnold Arboretum and by a grant from the William F. Milton Fund.

POLYPODIACEAE

by C. A. WEATHERBY

Woodsia mexicana Fée, Mém. Fam. Foug. **7**: 66. *t.* 26, *f.* 3 (1857).

COAHUILA: Sierra del Pino, crevices of limestone cliffs just below crest of high ridge west of La Noria, *Johnston & Muller* 612; Sierra Cruces, Cañon Tinaja Blanca, shaded cliff of igneous rock, open canyon, *Johnston & Muller* 284. CHIHUAHUA: Sierra Rica, Cañon Madera, scarce in shady rock-crevices in canyon, *Stewart* 2462. ZACATECAS: Concepcion del Oro, in earth in shade of rocks and bushes in elevated canyon, Aug. 1904, *Palmer* 257.

Western Texas to Arizona and south to San Luis Potosi and Vera Cruz. The two Coahuilan collections have the fronds glandular-pubescent beneath. They belong, accordingly, to the phase of the species described as *W. pusilla* Fourn. Bull. Soc. Bot. France **27**: 329 (1880), which outside our area has been collected in San Luis Potosi and in southern Arizona. In its glandularity this phase suggests *W. Plummerae*. It has, however, the deeply lacinate indusia characteristic of *W. mexicana*.

Woodsia Plummerae Lemmon, Bot. Gaz. **7**: 6 (1882).

CHIHUAHUA: Wet ledges in the hills northwest of Chihuahua, *Pringle* 455 and 834.

Ranging from trans-Pecos Texas (Davis Mts.) to Arizona and south into northern Mexico.

Cystopteris fragilis (L.) Bernh. in Schrad. Neu Jour. Bot. **12**: 26. *t.* 2, *f.* 9 (1806).

COAHUILA: Sierra del Carmen, Cañon Sentenela, *Wynd & Mueller* 521.

The collection cited is young and poorly developed, but it appears to belong with the Arizona phase of this cosmopolitan species described as subsp. *tenuifolia* Clute.

Dryopteris augescens (Link) C. Chr. var. **Lindheimeri** (C. Chr.) Broun, Ind. N. Am. Ferns 62 (1938).

D. normalis C. Chr. var. *Lindheimeri* C. Chr. Dansk. Vidensk. Selsk. Skr. Naturv. Afd. **10**: 182 (1913).

COAHUILA: Sierra Hechiceros, Cañon Indio Felipe, along creek in shady canyon, becoming 16 dm. tall, *Stewart* 73 and 113, *Johnston & Muller* 1376; Cañon del Agua Grande west of Las Delicias, by water, scarce, becoming 1 m. tall, *Stewart* 2797; El Tordillo, western margin of Valle de Delicias, frequent in shade near water, *Stewart* 2870.

The largest and most luxuriant fern in our area. It is known from southern Texas (as far east as Houston), Coahuila, Tamaulipas, and San Luis Potosi.

Phanerophlebia umbonata Underw. Bull. Torr. Bot. Cl. **26**: 211 (1899).

COAHUILA: Rancho Agua Dulce, wooded canyon on east slope of Sierra San Manuel, *Wynd & Mueller* 349; Sierra Gloria, *Marsh* 1871; Sierra Guajes, Cañon Milagro, shaded places in canyon, *Stewart* 1532 and 1533; Sierra Hechiceros, Cañon Indio Felipe, shade at base of cliffs in deep canyon, *Stewart* 523, *Johnston & Muller* 1362.

Mountains of Nuevo Leon, Tamaulipas, and Coahuila, and Chisos Mts., Texas.

Phanerophlebia auriculata Underw. Bull. Torr. Bot. Cl. **26**: 212 (1899).

COAHUILA: Sierra Mojada, Cañon Calabasa, fairly common in shade in deep canyon about 100 m. below crest, *Stewart* 2198. CHIHUAHUA: Canyon in Mapula Mts., southwest of Mapula Station, Oct. 1886, *Pringle* 831 (ISOTYPE).

Ranging from our area northward in western Chihuahua into Arizona and New Mexico.

Asplenium Palmeri Maxon, Contr. U. S. Nat. Herb. **13**: 39 (1909).

COAHUILA: Mountains 6 mi. east of Saltillo, 1880, *Palmer 1435*; San Antonio de los Alamos, under rocks in shaded gulch at base of high north-facing tuff cliffs, fronds prostrate, rooting at tip, *Johnston 8272*. CHIHUAHUA: Canyons in hills northwest of Chihuahua, Oct. 23, 1885, *Pringle 444*.

Ranging from central Texas to Arizona and south to Central America.

Asplenium resiliens Kunze, Linnaea **18**: 331 (1844).

COAHUILA: Rancho Agua Dulce, Sierra San Manuel, *Wynd & Mueller 351*; Sierra Gloria, *Marsh 1927*; mountains 6 mi. east of Saltillo, 1880, *Palmer 1435*; hills near Saltillo, shaded clay bank in deep arroyo, 1898, *Palmer 365*; hill near Saltillo, base of shaded rocks near summit, Aug. 10, 1905, *Palmer 755*; slope of mountain 24 km. northwest of Fraile, *Stanford et al. 408*; Sierra Guajes, Cañon Milagro, cliff-faces, *Stewart 1715*; mesa 15 km. northwest of Buena Vista, shade of cliff, *Stewart 1443*; escarpment on west side of Potrero de la Mula, about rocks on steep slope under oaks, *Johnston 9220*; Sierra Madera, Cañon del Agua, rock-crevices in moist dense wooded canyon, *Muller 3250*; Sierra Hechiceros, Cañon Indio Felipe, under rocks on bottom of deep shaded canyon, *Johnston & Muller 1360*; Sierra del Pino, crevices of north-facing limestone cliffs just below crest of high ridge west of La Noria, frequent, *Johnston & Muller 613*; western extremity of Sierra Madera, deep narrow canyon 2 km. southeast of Puertecito, shade of rocks on canyon bottom, *Johnston 9316*; Sierra Mojada, Cañon Hidalgo, shade in canyon below crest, *Stewart 1061*; Sierra Negras, 9 km. south of Parras, *Stanford et al. 193*. CHIHUAHUA: Sierra Rica, Cañon Madera, rock-crevices in shaded canyon, *Stewart 2474*.

Ranging from Pennsylvania, Kansas, and Arizona south along the Andean chain to Argentina (including *A. Lealii* Alston).

Asplenium exiguum Bedd. Ferns So. India *t. 146* (1863).

COAHUILA: Sierra Madera, Cañon del Agua, sparse in rock-crevices in moist densely wooded canyon, *Muller 3251*. CHIHUAHUA: Deep shaded damp glen at head of canyon next south of the large central canyon in the Mapula Mts., southwest of Mapula station, Nov. 4, 1886, *Pringle 833*.

A rare fern known only from scattered stations in Arizona, Sonora, Chihuahua, Coahuila, and Federal District, and from southern India and northern China.

Gymnopteris hispida (Mett.) Underw. Our Native Ferns ed. 6. 84 (1900).

Gymnogramma hispida Mett. ex Kuhn, Linnaea **36**: 72 (1869).

Bommeria hispida Underw. Bull. Torr. Bot. Cl. **29**: 633 (1902).

COAHUILA: Sierra Cruces, Cañon Tinaja Blanca, shelter of ledge in open canyon, *Johnston & Muller 281*. CHIHUAHUA: Sierra Rica, Cañon Madera, common in shaded places in canyon, *Stewart 2466*; Pirámide, base of rock-masses, *Johnston 8146*; 8 mi. northwest of Cruces, base of tuff cliff, *Johnston 7977*; Sierra Encinillas, 7 km. north of Fierro, among rocks on hillside, *Stewart 795*; near Chihuahua, *Pringle 465*.

This species ranges from western Texas to Arizona and south into Durango. In our area, at least, the species appears to be confined to areas of igneous rocks.

Pellaea cardiomorpha Weatherby, nom. nov.

Pteris cordata Cav. Descr. 267 (1802).

Pellaea cordata (Cav.) J. Sm. Cat. Kew Ferns 4 (1856), non Fée (1850-52).

COAHUILA: Sierra del Carmen, Cañon Sentenela, *Wynd & Mueller 590*. CHIHUAHUA: Sierra Rica, Cañon Madera, scarce in shady rock-crevices in canyon,

Stewart 2525; hills about 8 mi. northeast of Chihuahua, Oct. 17, 1885, *Pringle* 448. ZACATECAS: Pico de Teira, southwest of Cedros, Sept. 1908, *Lloyd* 247 (US).

The new name for this species, *P. cardiomorpha*, is put forward with some diffidence. *Pellaea cordata* (Cav.) J. Sm. is definitely illegitimate, but, following Hooker, most authors have regarded *P. sagittata* (Cav.) Link as synonymous with it. If this be correct, the name *P. sagittata*, which is quite clear under *Pellaea*, should be taken up. But the material at hand indicates that the two species proposed by Cavanilles really differ in several characters, most of which, as Hooker long ago pointed out in regard to some of them, are not as constant as one could wish, but which, taken together, seem to give adequate grounds for separation. I have accordingly preferred to coin a new name in place of *P. cordata*, which has no indubitable synonym. The two species may be distinguished as follows:

Rhizome-scales bright brown in mass (contrasting with those of bud and stipe), linear or linear-lanceolate, sparsely pectinate with long, often retrorse teeth; blades not dimorphic, rachis and rachillae always glabrous, pinnules very broadly cordate, usually as broad as long, the margins usually not strongly revolute; spores globose or obtusely triangular in outline, especially so as seen from the commissural face, averaging about 50 μ in diameter.....	<i>Pellaea cardiomorpha</i> .
Rhizome-scales pale brown, not contrasting with those of bud and stipe, mostly rather broadly lanceolate and serrulate with short teeth; fronds somewhat dimorphic, the sterile smaller and with broad plane pinnules, rachis and rachillae often with short and thick glandular hairs on upper surface, pinnules of the fertile fronds from deltoid-ovate to deltoid-lanceolate, the margins often strongly revolute; spores globose or the larger broadly ellipsoid, varying considerably in size, 65–80 μ , commonly about 75 μ	<i>Pellaea sagittata</i> .

In addition to the above enumerated characters, the pinnae of *P. cardiomorpha* tend to stand at a broad angle to the rachis, those of the fertile fronds of *P. sagittata* to be more or less strongly ascending. In both, the lower leaf-surface may be either glabrous or pubescent with white hairs. In mature and well developed material the spore-characters hold consistently.

As here defined, *P. cardiomorpha* becomes a species mainly of northern and central Mexico, extending north to the Davis Mts., Texas, and south in eastern Mexico to Hidalgo, Michoacan, and Oaxaca. *Pellaea sagittata* ranges from San Luis Potosi and Zacatecas south to Guatemala and southward along the Andes to Bolivia.

Pellaea intermedia Mett. ex Kuhn, *Linnaea* **36**: 84 (1869).

COAHUILA: Sierra del Pino, Cañon Ybarra, arroyo banks, *Stewart* 1821; Sierra del Pino, La Noria, crevices in limestone along narrow shaded arroyo, *Johnston & Muller* 642; Picacho de San José, crevices of cliffs, *Stewart* 1115; San Antonio de los Alamos, about shaded tuff cliffs, *Johnston & Muller* 859 and 900; Lerios, 1880, *Palmer* 1426; Carneros Pass area, 1880, *Palmer* 1427; 4 km. east of Fraile, *Stanford et al.* 354; Sierra Negras, 9 km. south of Parras, *Stanford et al.* 161. CHIHUAHUA: Sierra Santa Eulalia, limestone ledges, *Pringle* 461. ZACATECAS: Mountain 18 km. west of Concepcion del Oro, *Stanford et al.* 576; Cedros, ravines, *Lloyd & Kirkwood* 135.

Ranging from trans-Pecos Texas to Arizona and south into our area and eastward into the mountains of Nuevo Leon. The type of *P. intermedia* is the rare glabrous phase of the species. Our plants belong to the common forma *pubescens* (Mett. ex Kuhn) Broun.

Pellaea ovata (Desv.) Weatherby, Contr. Gray Herb. **114**: 34 (1936).

Pellaea flexuosa (Kaulf. ex C. & S.) Link, Fil. Sp. 60 (1841).

COAHUILA: Sierra San Manuel, Rancho Agua Dulce, *Wynd & Mueller* 318; western base of Sierra Guajes 8 km. east of Buena Vista, igneous hillside, not common, *Stewart* 1467.

From central and southern Texas south through eastern Coahuila and the eastern Sierra Madre to Central and South America.

Pellaea atropurpurea (L.) Link, Fil. Sp. 59 (1841).

COAHUILA: Sierra San Manuel, Rancho Agua Dulce, *Wynd & Mueller* 358; western base of Sierra del Carmen 8 km. east of Hac. Encantada, shade in canyon, *Stewart* 1698; Sierra Guajes, Cañon Milagro, hillside, *Stewart* 1725; Sierra Madera, Cañon Charretera, stream-gravel in oak thicket, *Johnston* 9040; Sierra Gloria, *Marsh* 1888; Sierra Hechiceros, Cañon Indio Felipe, foot of talus slope, *Stewart* 171 and 172; Sierra del Pino, Cañon Ybarra, shade in caynon, *Stewart* 1813; Sierra del Pino, La Noria, shaded bushy arroyo-bank, *Johnston & Muller* 476; Picacho de San José, cliff-crevices, *Stewart* 1111; Sierra Mojada, Cañon Hidalgo, in shaded canyon below crest, *Stewart* 1065. CHIHUAHUA: Sierra Rica, Cañon Madera, rock-crevices in shaded canyon, *Stewart* 2475.

Ranging from Vermont and western South Dakota south to Guatemala.

Pellaea Wrightiana Hook. Sp. Fil. **2**: 142 (1858).

COAHUILA: Sierra Hechiceros, Rancho El Tule, about rocks on sunny hillside, *Johnston & Muller* 1309. CHIHUAHUA: Sierra Virulento, one plant on steep rocky east slope 3 mi. east of Rancho Virulento, *Johnston* 8090.

Ranging from central Texas to Baja California. Apparently a plant of igneous rocks.

Pellaea ternifolia (Cav.) Link, Fil. Sp. 59 (1841).

CHIHUAHUA: Grassy summits of the Sierra Santa Eulalia, southeast of Santa Eulalia, Nov. 5, 1885, *Pringle* 446; cool rocky slopes of mountains near Chihuahua, Oct. 1886, *Pringle* 920.

From southeastern Arizona south along the western Sierra Madre, extending to Peru, Argentina, and northern Chile. Apparently a plant of igneous rocks.

Pellaea microphylla Mett. ex Kuhn, Linnaea **36**: 86 (1869).

COAHUILA: Sierra San Manuel, Rancho Agua Dulce, *Wynd & Mueller* 320; Hill-coat Mesa, west of Encantada Ranch, *Marsh* 1454; high mesa 14 km. northwest of Buena Vista, common on open hillside, *Stewart* 1435; Sierra Madera, Cañon Charretera, rocky bed of arroyo, abundant, *Johnston* 8930; Sierra Gavia, under rocks on canyon floor, *Johnston* 7206; Puerto San Lazaro, scattered on open talus slope, *Muller* 3079; mountains 6 mi. east of Saltillo, 1880, *Palmer* 1423; San Lorenzo Canyon, 6 mi. southeast of Saltillo, rather common in rather exposed parts of canyon, Sept. 1904, *Palmer* 404; Lerios, July 1880, *Palmer* 1424; mountain 24 km. northwest of Fraile, *Stanford et al.* 416; Sierra del Pino, Cañon Ybarra, rocky hillside, common, *Stewart* 1884; Sierra del Pino, summit of great western escarpment about 10 mi. north of La Noria, under rocks, *Johnston & Muller* 552; Sierra del Pino, crest of eastern ridge about 4 mi. northeast of La Noria, under rocks, *Johnston & Muller* 654; western base of Picacho del Fuste, limestone ledges on north slope, *Johnston* 8389; top of Cuesta Zozaya, about rocks on dry open slope, *Johnston* 9291; western extremity of Sierra Madera, deep narrow canyon 2 mi. southeast of Puertecito, among rocks of canyon-floor and in rock-crevices on canyon-walls, *Johnston* 9318; Santa Elena, eastern foothills of Sierra Cruces, ledges and rocky slopes, *Johnston & Muller* 207, *Stewart* 271 and 346; Sierra Mojada, Cañon Hidalgo, shade in canyon below crest, *Stewart* 1066; east side of Valle Acatita, crevices in limestone 2 km. northeast of Parritas, *Stewart* 2767; margin of

Valle Delicias, 1 km. northwest of mouth of Cañon Blanco, frequent in arroyos, *Stewart 2912*. CHIHUAHUA: Sierra San Carlos, base of cliff near mouth of canyon, *Johnston & Muller 44*; Sierra Almagre, dry sunny floor of arroyos, *Johnston & Muller 1136*; high northwestern end of Sierra Diablo, rocky hillside, *Stewart 986*; Sierra Santa Eulalia, limestone hillside, *Pringle 440* and *458*; pass 19 mi. east of Jimenez, limestone hillside, *Johnston 7854*. ZACATECAS: valley 15 km. west of Concepcion del Oro, *Stanford et al. 47*.

Centering in our area and extending eastward into the Sierra Madre of Nuevo Leon, and northward to the south escarpment of the Edwards Plateau and trans-Pecos Texas. Confined to limestone.

Notholaena delicatula Maxon & Weatherby, Contr. Gray Herb. **127**: 7 (1939).

COAHUILA: Sierra Madera, Charretera Cañon, steep north slope in conifer forest, on rocks, about 8500 ft. alt., *Johnston 9046*; Lerios, July 1880, *Palmer 1387* (TYPE); Carneros Pass area, March 1880, *Palmer 1385*.

Endemic to the mountains of southeastern Coahuila and northern Nuevo Leon. The record from Jalisco, Maxon & Weatherby, l. c., was caused by an error on one of Pringle's labels. Though indicated to be from Jalisco, the collection actually came from near Monterey, Nuevo Leon.

Notholaena limitanea Maxon, var. **mexicana** (Maxon) Broun, Ind. No. Am. Ferns **119** (1938).

Notholaena limitanea subsp. *mexicana* Maxon, Amer. Fern Jour. **9**: 72 (1919).

COAHUILA: Sierra Madera, Cañon Charretera, on rocks on steep north slope in coniferous forests, about 8500 ft. alt., *Johnston 9046a*; base of mountains southeast of Saltillo, road to Diamante Pass, limestone ledge, *Johnston 7269*; Carneros Pass, *Pringle 3031* (Field Mus.); Sierra del Pino, high western ridge 10 mi. north of La Noria, under limestone rocks along ridge-crest, *Johnston & Muller 551*; Sierras Negras, 9 km. south of Parras, *Stanford et al. 201* in pt.; Picacho de Jimulco, summit, *Stanford et al. 107*. CHIHUAHUA: Sierra Santa Eulalia, limestone ledges, Sept. 13, 1885, *Pringle 451* (ISOTYPE). ZACATECAS: mountain 18 km. west of Concepcion del Oro, *Stanford et al. 574*; Cedros, canyons, *Kirkwood 140*.

Ranging from our area into Durango and possibly Tamaulipas. Among the cited collections, *Johnston 7269* is exceptionally stout and strict for this variety. It is, however, approached by some individuals of the type collection, and in all technical details, especially the strongly reticulate-rugose spores, it entirely agrees with them.

Notholaena aurea (Poir.) Desv. Mém. Soc. Linn. Paris **6**: 219 (1827).

VERNACULAR NAMES: Canaguala; Canawala.

COAHUILA: Sierra del Carmen, Cañon Sentenela, *Wynd & Mueller 511*; Mesa Grande, high mesa 40 km. northwest of Hac. Encantada, open hillside, not common, *Stewart 1644*; Soledad, Sept. 1880, *Palmer 1399*; Saltillo, purchased in market, Sept. 1898, *Palmer 369*; mountain borders near Saltillo, July 6, 1848, *Gregg 219*; Sierra Hechiceros, Cañon Indio Felipe, common at base of cliffs and on talus, *Stewart 89* and *135*; Sierra Hechiceros, Rancho El Tule, about rocks on arid hillside, *Johnston & Muller 1310*; San Antonio de los Alamos, local, shaded places under tuff cliffs, *Johnston & Muller 899*; Sierra Jimulco, 11 km. northeast of Jimulco, *Stanford et al. 84*. CHIHUAHUA: Sierra Rica, Cañon Madera, common on open sunny slopes, *Stewart 2467*; Pirámide, one colony at base of large rock-masses, *Johnston 8144*; Sierra Virulento, rocky east slope, *Johnston 8083*; 8 mi. northwest of Cruces, base of sandstone cliff, *Johnston 7980*; 11 mi. northeast of Camargo, lava cliff, *Johnston 7896*; rocky hills near Chihuahua, Oct. 1885, *Pringle 462*.

Ranging from Texas and Arizona south to Argentina. Palmer reports

that this fern is sold in the market at Saltillo, a decoction of the plant being taken internally for "pain in the stomach and for coughs."

Notholaena sinuata (Lag.) Kaulf. Enum. Fil. 135 (1824).

VERNACULAR NAMES: Nacahuela; Lengua de Cervo.

COAHUILA: Sierra del Carmen, Cañon Sentenela, *Wynd & Mueller* 510; Sierra Encantada, Cañon San Enrique, west of Buena Vista, bank of dry arroyo, *Stewart* 1407; Sierra Azul, Buena Vista Ranch, July 8, 1938, *Marsh* 1220; Saltillo, crevices of sandstone at summit of a mountain, 1898, *Palmer* 183; Lerios, 1880, *Palmer* 1400; 3 km. southwest of Fraile, in arroyo, *Stanford et al.* 336; Sierra del Pino, Cañon Ybarra, arroyo banks, *Stewart* 1821a; Sierra Madera, Cañon Charretera, moist ledges, *Johnston* 9097; Cañon de Jara, east of Socorro, *Schroeder* 10; Sierra Cruces, near Santa Elena, shady arroyo, *Stewart* 292; Picacho de San José, crevices of cliffs, *Stewart* 1110; Sierras Negras, 9 km. south of Parras, *Stanford et al.* 203; Picacho de Jimulco, summit, *Stanford et al.* 105. CHIHUAHUA: 11 miles northeast of Camargo, lava cliff, *Johnston* 7923. ZACATECAS: Cedros, canyons, *Lloyd & Kirkwood* 138 in pt.

South-central Texas to Arizona and southward in the Andean region to northern Argentina.

Notholaena sinuata var. **integerrima** Hook. Sp. Fil. 5: 108 (1864).

COAHUILA: Rancho Agua Dulce, Sierra San Manuel, *Wynd & Mueller* 321; Sierra Azul, Buena Vista Ranch, July 8, 1938, *Marsh* 1250; Soledad, 1880, *Palmer* 1402; Saltillo, 1880, *Palmer* 1401; Buena Vista, 1848, *Gregg* 297 in pt.; San Antonio de los Alanzanes, 1848, *Gregg* 365; Lerios, 1880, *Palmer* 1406; mountain valley 24 km. northwest of Fraile, *Stanford et al.* 429a; Sierra del Pino, Cañon Ybarra, arroyo banks, *Stewart* 1843; about 10 miles north of Cuatro Cienegas, *Wynd* 745a; El Coyote, east side Valle Acatita, *Stewart* 2731 and 2751; Puerto Ventanillas, south of Las Delicias, on slopes, *Stewart* 2963; mouth of Cañon Blanco, north end of Valle Delicias, *Stewart* 2904; San Lorenzo de Laguna, 1880, *Palmer* 1409. CHIHUAHUA: Chihuahua, *Pringle* 464 in pt. ZACATECAS: Mountain 18 km. west of Concepcion del Oro, *Stanford et al.* 575; Cedros, canyons, *Lloyd & Kirkwood* 136 in pt. and 137.

Southern Oklahoma (Arbuckle Mts.) and central Texas to southeastern Arizona and southward, mostly along the eastern Sierra Madre, to Vera Cruz.

Hooker's name, *N. sinuata* var. *integerrima*, has very generally been applied to the plant here classified as *N. sinuata* var. *cochisensis*. That application can no longer be maintained. When he proposed var. *integerrima*, Hooker cited three collections in the Kew Herbarium, of Liebmann, Gregg [297] and Seemann [1928]. Of these, only the Liebmann specimen is labelled as belonging to the variety. It is a single small frond with oblong, quite entire pinnae, the scales of the lower surface like those of typical *N. sinuata*, but those of the upper relatively broad-bladed and persistent as in var. *cochisensis*. The Seemann material is similar, though much more ample, the sheet containing four complete individuals. The pinnae are small, the smallest approaching the dimensions of var. *cochisensis*, and there is also some approach to that variety in the scales of the lower surface. The Gregg collection, as represented in Hooker's herbarium, consists of a detached frond similar to the Liebmann specimen and an entire plant of var. *cochisensis*. Had Hooker cited this last Gregg specimen particularly or accounted for it in his description, it might have been designated as type and the usual application of his name maintained.

But one can hardly reconcile his statement "pinnae entire or nearly so" with var. *cochisensis*, in which the pinnae, though tiny, show at least one conspicuous lobe. In view of this and of Hooker's having labelled only the Liebmann specimen, it must be taken as type and the epithet *integerrima* applied accordingly.

Field observation and a restudy of material in the Gray Herbarium indicate that rather numerous specimens with shallowly lobed pinnae, which have hitherto either been associated with var. *cochisensis* or regarded as dwarfed individuals of typical *N. sinuata*, actually belong with var. *integerrima*, as represented by the Liebmann and Seemann collections. They are like these collections in their combination of scale-characters, in their small size, and, except for the lobing of the pinnae, in habit. They are accordingly here placed in var. *integerrima*. So understood, that group becomes a reasonably consistent, if not altogether happily named, variety, intermediate in characters between typical *N. sinuata* and var. *cochisensis*, grading into both, and with the mainly Texan and northeast-Mexican range above indicated.

In central Mexico, typical *N. sinuata* also produces a phase with entire pinnae (*N. laevis* of authors, not Mart. & Gal.; *N. crassifolia* Moore & Houlst.; *N. pruinosa* Fée).

Notholaena sinuata var. **cochisensis** (Goodding) Weatherby, comb. nov.

Notholaena cochisensis Goodding, *Muhlenbergia* 8: 93 (1912).

Notholaena sinuata var. *crenata* Lemmon, *Ferns Pacific Slope* 7 (1882), nomen nudum.

VERNACULAR NAMES: Canelilla; Doradillo.

COAHUILA: Between Rancho Santo Domingo and Hac. Piedra Blanca, Wynd & Mueller 659 (US); Sierra Azul, Buena Vista Ranch, July 8, 1938, Marsh 1239; Sierra San Vicente, Cañon Espantosa, Schroeder 61; 6 mi. north of Hipolito, Johnston 7235; mountains 6 mi. east of Saltillo, 1880, Palmer 1401; Buena Vista, 1848, Gregg 297 in pt.; Chojo Grande, 27 mi. southeast of Saltillo, 1904, Palmer 359; Lerios, 1880, Palmer 1405; Carneros Pass area, 1880, Palmer 1407 in pt.; 4 km. east of Fraile, Stanford et al. 355; Sierra del Pino, ridge-crest 4 mi. northeast of La Noria, Johnston & Muller 652; Sierra Madera, Cañon Charretera, ledges, Johnston 9096; 10 mi. north of Cuatro Cienegas, Wynd 745; Cañon de Jara, east of Socorro, Schroeder 16; Sierra Cruces, near Santa Elena, slopes, Johnston & Muller 235; Cañon del Agua Chica, west of Las Delicias, gypsum, Stewart 2827; near mouth of Cañon Blanco, Sierra Margaritas, limestone crevices, Stewart 2905; San Lorenzo de la Laguna, 1880, Palmer 1410; Sierras Negras, 9 km. south of Parras, Stanford et al. 194; Sierra Jimulco, 11 km. northeast of Jimulco, Stanford et al. 42. CHIHUAHUA: Sierra Rica, Dec. 1882, Newberry; Chihuahua, 1908, Palmer 357; pass 19 mi. east of Jimenez, limestone, Johnston 7853; 6 mi. west of Piloncillo, lava hillside, Johnston 7880a. DURANGO: 23 mi. north of Zaragoza, under sandstone rocks, Johnston 7792. ZACATECAS: Valley 15 km. west of Concepcion del Oro, Stanford et al. 548; Cedros, canyons, Lloyd & Kirkwood 138 in pt.

This is the plant which has long been called *N. sinuata* var. *integerrima*. The three recognizable variants of *N. sinuata* may be distinguished as follows:

Pinnae 1 cm. or more long, ovate, commonly subacute and cut $\frac{1}{3}$ – $\frac{1}{2}$ to the midrib into 4–6 pairs of oblong lobes; scales of the upper surface of the lamina with narrow central portion or reduced to stellate processes, usually soon deciduous, those of the

lower surface lanceolate, up to 1.5 mm. long; rhizome-scales pectinate-ciliate or -serrulate.....*N. sinuata* (typical).

Pinnae mostly less than 1 cm. long, very obtuse, with 1-3 pairs of broadly ovate lobes or entire; scales of the upper surface with relatively broad central portion, usually persistent till full maturity of the frond.

Pinnae oblong, entire or with about 3 pairs of shallow lobes; scales of lower surface and rhizome as in the typical variety.....var. *integerrima*.

Pinnae subquadrate, nearly or quite as broad as long, with 1 or 2 (rarely 3) pairs of lobes; scales of the lower surface ovate, 0.5 mm. long; rhizome-scales entire or nearly so.....var. *cochisensis*.

A good many field observers are of the opinion that var. *cochisensis* should be treated as a distinct species, and their contention has been strengthened by the recent discovery that the variety is poisonous to stock, the typical form not. Nevertheless, judged by the usual taxonomic evidence, var. *cochisensis* is so connected with the typical variety, through var. *integerrima*, that the traditional treatment of it as a variety only is not unreasonably conservative.

Notholaena Aschenborniana Klotzsch, *Linnaea* **20**: 417 (1847).

COAHUILA: Sierra San Manuel, *Wynd & Mueller* 337 (US); Sierra Gavia, 5 mi. north of Saucillo, under rocks, terrace on canyon-floor, *Johnston* 7209; mountains 8 mi. west of Saltillo, hillside, *Johnston* 7660; San Lorenzo Canyon, 6 mi. southeast of Saltillo, sunny arroyo-banks at canyon-mouth, 1904, *Palmer* 402; Sierra del Pino, La Noria, crevices of limestone in narrow shaded arroyo, *Johnston & Muller* 643; western base of Picacho del Fuste, north-facing slope about limestone ledges, *Johnston* 8384; Sierra Madera, Cañon Charretera, ledges and rocky arroyo-bed, *Johnston* 8928, 8931a, 9094; gorge just east of Socorro, on cliffs, *Johnston* 8850a; Sierra Mojada, *Jones* 531 (US); western edge of Valle Acatita, 2 km. northeast of Parritas, shaded crevices in limestone, *Stewart* 2768; Cañon Blanco, Sierra Margaritas, shade of cliffs, *Stewart* 2915; Sierra Negras, 9 km. south of Parras, *Stanford et al.* 204. CHIHUAHUA: Sierra Santa Eulalia, limestone ledges, *Pringle* 466 and 469.

Western Texas to Arizona and south to central Mexico.

Notholaena Schaffneri (Fourn.) Underw. var. **Nealleyi** (Seaton) Weatherby, comb. nov.

Notholaena Nealleyi Seaton ex Coulter, *Contr. U. S. Nat. Herb.* **1**: 61 (1890).

COAHUILA: Mountains 4 mi. west of Cuatro Cienegas, shaded rock-crevices in small canyon, *Johnston* 7167; Sierra Cruces, sheltered on north-facing limestone ledges at Santa Elena, *Johnston & Muller* 205.

The type of *N. Nealleyi* came from Limpia Canyon, Jeff Davis Co., Texas (*Nealley* 560). These, at least, are the data accompanying the specimen designated as type in the U. S. Nat. Herb. The collector's number has been changed from 894 to 560. As published, the type was said to come from the Chinati Mts. and to be numbered 894. Other collections of this fern have been made at Goodenough Springs, Val Verde Co., Texas (*Nealley* 123), and from Barranco de Santa Maria, Zacuapan, Vera Cruz (*Purpus* 6199). They may be distinguished from typical *N. Schaffneri* as follows:

Rhizome-scales narrowly linear-attenuate, densely and conspicuously pectinate-ciliate; median pinnae with 4-6 pairs of free pinnules.....*N. Schaffneri* (typical).

Rhizome scales linear-subulate, sparsely and inconspicuously pectinate-ciliate; median pinnae usually with 1-3 pairs of free pinnules.....*N. Schaffneri* var. *Nealleyi*.

The Nealley and Purpus specimens, mentioned above, are small and

have passed as immature individuals. The two collections from Coahuila, however, have fronds up to 22 cm. long and freely soriferous, and are obviously full grown. The characters of the variety are retained even in this mature state. Davenport, Bot. Gaz. **16**: 54 (1891), observed that two plants were involved in this species-aggregate, but unfortunately he supposed Fournier's rather small type material to be the same as Nealley's specimens and gave a new name (*N. Schaffneri* var. *mexicana*) to the typical variety of *N. Schaffneri*.

Notholaena Grayi Davenp. Bull. Torr. Bot. Cl. **7**: 50 (1880).

COAHUILA: Soledad, Sept. 1880, *Palmer 1388*; San Antonio de los Alamos, under rocks, dry basalt in upper canyon, *Johnston & Muller 926*. CHIHUAHUA: Sierra Encinillas, rocky hillside 6 km. north of Fierro, common in crevices, igneous rocks, *Stewart 790*; cliffs of volcanic tuff, 8 mi. northwest of Cruces, *Johnston 7984*; 11 mi. northeast of Camargo, lava cliff, *Johnston 7902*; 6 mi. west of Piloncillo, lava hillside, *Johnston 7880*; rocky hills near Chihuahua, *Pringle 463* in pt.

Ranging from Texas and Arizona south through Chihuahua and Sonora to Jalisco.

Notholaena aliena Maxon, Contr. U. S. Nat. Herb. **17**: 605 (1916).

COAHUILA: Soledad, Sept. 1880, *Palmer 1389* (ISOTYPE). CHIHUAHUA: Rocky hills near Chihuahua, Oct. 1885, *Palmer 463* in pt.

Known from Tamaulipas, Coahuila, Chihuahua, and Arizona.

Notholaena candida (Mart. & Gal.) Hook. Sp. Fil. **5**: 110 (1864).

COAHUILA: Villa Juarez, Sept. 1880, *Palmer*; Muzquiz, *Marsh 351* (US); mountains northeast of Monclova, Sept. 1880, *Palmer 1380*; Sierra Gavia, 5 mi. north of Saucillo, under rocks on terrace in canyon, *Johnston 7205*; gorge just east of Socorro, on cliffs, *Johnston 8849*; western extremity of Sierra Madera, deep narrow canyon 2 km. northeast of Puertecito, ledges on canyon-wall, *Johnston 9319*.

Ranging from Texas and New Mexico south to Guatemala.

Notholaena neglecta Maxon, Contr. U. S. Nat. Herb. **17**: 602 (1916).

COAHUILA: San Lorenzo Canyon, 6 mi. southeast of Saltillo, a few plants in narrow seams in the rock near the ground, dry but somewhat shaded, 1904, *Palmer 424*; Saltillo, crevices on dry sloping side of canyon, 1902, *Palmer 324* (ISOTYPE); high western ridge of Sierra Fragua, north of Puerto Colorado, under rocks on pinyon-clad steep east-slope, scarce, *Johnston 8775*; western extremity of Sierra Madera, deep narrow canyon 2 km. southeast of Puertecito, ledges on canyon-wall, one colony, *Johnston 9319a*; Sierra Cruces, canyon 5 mi. southwest of Santa Elena, crevices of shales on shaded canyon-wall, local, *Johnston & Muller 822*; La Botica, Sierra Margaritas, limestone cliffs, scarce, *Stewart 2894*; Sierra Mojada, Apr. 19, 1892, *Jones 520* (US). CHIHUAHUA: Sierra Santa Eulalia, limestone cliffs, Sept. 9, 1885, *Pringle 452*.

Ranging from southeastern Arizona south into Chihuahua and into eastern Coahuila. The collection from the Sierra de la Fragua is an unusually narrow-bladed form with relatively small basal pinnae.

Notholaena Standleyi Maxon, Amer. Fern Jour. **5**: 1 (1915).

COAHUILA: Near Santo Domingo, igneous hill, *Wynd & Mueller 467*; Saltillo, summit of mountain, shaded crevices of sandstone, May 1898, *Palmer 184*; Saltillo, 1905, *Palmer 754*; Carricito, north-facing ledge of lava, *Johnston & Muller 163*; eastern foothills of Sierra Cruces, vicinity of Santa Elena, shaded rock-crevices, *Stewart 347*; Sierra Cruces, Cañon Tinaja Blanca, hillsides and along arroyo, *Stewart 330* and *624*, *Johnston & Muller 296*; base of tuff cliffs 3 mi. northwest of San Antonio

de los Alamos, *Johnston & Muller* 857; La Botica, base of Sierra Margaritas, limestone cliffs, *Stewart* 2893; canyon-mouth, Cañon Blanco, Sierra Margaritas, crevices on slope, *Stewart* 2907; canyon 6 mi. west of Viesca, *Johnston* 7744; Picacho de Jimulco, about summit, *Stanford et al.* 89; San Lorenzo de la Laguna, 1880, *Palmer* 1379. CHIHUAHUA: Sierra Rica, Dec. 1882, *Newberry*; Sierra San Carlos, road to mines, base of limestone cliff at canyon-mouth, *Johnston & Muller* 37; Sierra Encinillas, 7 mi. north of Fierro, among rocks on hillside, *Stewart* 794; 8 mi. northwest of Cruces, base of tuff cliff, *Johnston* 7979; hills west of Chihuahua, *Pringle* 467; Meoqui, *LeSueur* 1138; 11 mi. northeast of Camargo, lava cliff, *Johnston* 7895; Cañon La Renga, 15 km. northwest of Santa Fe, crevices of limestone, common, *Stewart* 2618.

Ranging from Texas and western Oklahoma to Nevada and Arizona and south through western Mexico to central Mexico.

Notholaena Greggii (Mett. ex Kuhn) Maxon, Contr. U. S. Nat. Herb. **17**: 606 (1916).

Pellaea Greggii Mett. ex Kuhn, Linnaea **36**: 86 (1869).

Allosorus Greggii (Mett. ex Kuhn) Kuntze, Rev. Gen. **2**: 806 (1891).

Notholaena Pringlei Davenp. Bull. Torr. Bot. Cl. **13**: 132. t. 58 (1886).

Cheilanthes Davenportii Domin, Bibl. Bot. **20**[Heft 85]: 133 (1915).

COAHUILA: Monclova, Aug. 1880, *Palmer* 1383; 10 mi. north of Cuatro Cienegas, Wynd 747; Lomas del Aparejo, eastern side of Llano de Guaje, dry limestone ledges on sunny hillside, *Johnston & Muller* 774; Tanque La Luz, south end of Cañada Oscuro, limestone ledges between gypsum on escarpment, *Johnston* 8503; Sierra Cruces, limestone ledges near Santa Elena, *Johnston & Muller* 206; south base of Picacho de San José, in arroyo, confined to gypsum, *Johnston & Muller* 817; San José, under basaltic rocks on rocky hillside, *Johnston & Muller* 994; Sierra Planchada, 6 mi. northeast of Esmeralda, limestone ledges on hillside, *Johnston & Muller* 833; Sierra Mojada, *Jones* 519 (US); Cerro Zapatero, July 1910, *Purpus* 4633; El Coyote, eastern margin of Valle Acatita, crevices on slope, *Stewart* 2743; Rancho Las Uvas, east side Valle Acatita, gypsum, *Stewart* 2693; Cañon del Agua Chica, west of Las Delicias, shade on gypsum cliffs, *Stewart* 2831; mouth of Cañon Blanco, Sierra Margaritas, limestone crevices, *Stewart* 2906; San Lorenzo de la Laguna, May 1880, *Palmer* 1382 and 1383. CHIHUAHUA: Sierra Rica, Dec. 1882, *Newberry*; Sierra Santa Eulalia, dry calcareous ledges and bluffs, April 23, 1885, *Pringle* 441 (type of *N. Pringlei*); Sierra Santa Eulalia, calcareous bluffs, Nov. 15, 1888, *Pringle* 857; Cañon del Coyote, 20 km. northwest of Santa Fe, crevices of limestone, common, *Stewart* 2614. DURANGO: Rocky hill northwest of Mapimi, April 17, 1847, *Gregg* 467 (ISOTYPE of *N. Greggii*); Lerdo, Cerro el Raymundo, *Chaffey* 58 in pt. (US); 7 mi. southwest of Chocolate, shaded slope, *Shreve* 9113.

This species is practically confined to our area. Outside, it has been found on the northern side of the Rio Grande at the mouth of Boquillas Canyon in Texas. While evidently not confined to it, the species is frequently found on or near gypsum. The type of *Notholaena Greggii*, judging from the date on the type-specimen, was collected near the Durango-Chihuahua state-line northwest of Mapimi, between Jaralito and Arroyo de Cerro Gordo.

Notholaena bryopoda Maxon, Proc. Biol. Soc. Wash. **18**: 205 (1905).

COAHUILA: Western base of Picacho del Fuste, north-facing mountain-side, common on all gypsum beds and confined to them, *Johnston* 8354; south end of Cañada Oscuro near Tanque La Luz, common on the gypsum beds on the escarpment, confined to gypsum, *Johnston* 8488; eastern foothills of Sierra Cruces near Santa Elena, forming large clumps on gypsum beds, confined to gypsum, *Stewart* 839, *Johnston & Muller* 243; Rancho del Coyote, eastern margin of Valle Acatita, crevices on gypsum, common, *Stewart* 2732.

Outside of our area this fern is known only from the type-collection, made by Pringle in the mountains of southern Nuevo Leon, 15–20 miles south of Doctor Arroyo. The plant appears to be a marked gypsophile. In the Sierra Cruces, near El Fuste, and in Cañada Oscuro, the plant was abundant and luxuriating on gypsum and confined to that substratum. It forms dense clumps which may become as much as a meter in diameter.

Cheilanthes alabamensis (Buckl.) Kunze, *Linnaea* **20**: 4 (1847).

COAHUILA: Rancho Agua Dulce, wooded canyon on east slope of Sierra San Manuel, *Wynd & Mueller* 377; ravine near Puerto Santa Anna, Hac. Mariposa, *Wynd & Mueller* 219; Sierra Guajes, Cañon Milagro, faces of cliffs, *Stewart* 1714; Caracol Mts., 1880, *Palmer* 1419; Soledad, Sept. 1880, *Palmer* 1420; Saltillo, shaded clay bank in deep arroyo, 1898, *Palmer* 366 in pt.; Saltillo, Sierra del Pueblo, moist rock crevices near ground, 1904, *Palmer* 433 in pt.; San Lorenzo Canyon, 6 mi. southeast of Saltillo, Sept. 1904, *Palmer* 405 in pt.; San Lorenzo Canyon, shaded rocky canyon wall, Sept. 1904, *Palmer* 403; Cañon del Chojo Grande, 27 mi. southeast of Saltillo, earth at base of shady rock, Aug. 1904, *Palmer* 377; General Cepeda, high bluff, 1904, *Palmer* 326 in pt.; Sierra del Pino, La Noria, shaded arroyo banks, *Johnston & Muller* 495 and 644; western extremity of Sierra Madera, deep narrow canyon 2 km. southeast of Puertecito, under rocks on shaded canyon-floor, *Johnston* 9314; Sierra Parras, March 1905, *Purpus* 1100; Sierra Hechiceros, Cañon Indio Felipe, under rocks in deep shaded canyon, *Johnston* 1361; Sierra Cruces, Cañon Tinaja Blanca, shrubby banks and shaded cliffs, *Stewart* 331, *Johnston & Muller* 282; San Antonio de los Alamos, moist shaded places about tuff cliffs, *Johnston & Muller* 894. CHIHUAHUA: Sierra Almagre, about rocks in deep shaded canyon, *Johnston & Muller* 1193; Sierra Santa Eulalia, shaded places, Nov. 2, 1885, *Pringle* 449.

This fern ranges from Virginia to Florida, west to Missouri and Arizona, and south into Nuevo Leon, Coahuila, and Chihuahua.

Cheilanthes notholaenoides (Desv.) Maxon ex Weatherby, *Contr. Gray Herb.* **114**: 34 (1936).

VERNACULAR NAME: Sanguinaria.

COAHUILA: Saltillo, shaded clay bank in deep arroyo, 1898, *Palmer* 366 in pt.; Saltillo, under rock ledge on exposed hillside, June 1898, *Palmer* 238; Saltillo, purchased in market under name "Sanguinaria," Sept. 1898, *Palmer* 368; mountains 6 mi. east of Saltillo, 1880, *Palmer* 1418; base of mountains southeast of Saltillo, road to Diamante Pass, *Johnston* 7268; San Lorenzo Canyon, 6 mi. southeast of Saltillo, Sept. 1904, *Palmer* 405 in pt.; Carneros Pass area, March 1880, *Palmer* 1417; mountains 24 km. northwest of Fraile, in arroyo, *Stanford et al.* 385; Sierra Madera, Cañon Charretera, in shade on rocky bed of arroyo, *Johnston* 8929; Sierra Mojada, Cañon Hidalgo, shade in canyon below crest, common, *Stewart* 1067; Sierra Negras, 9 km. south of Parras, *Stanford et al.* 209. CHIHUAHUA: Sierra Almagre, under rocks on shaded canyon-floor, *Johnston & Muller* 1152; Sierra Santa Eulalia, shaded places, Nov. 2, 1885, *Pringle* 449. ZACATECAS: Mountain 18 km. west of Concepcion del Oro, *Stanford et al.* 573; Cedros, *Lloyd* 125.

Entering our area from the south and southeast, extending north from Guatemala through eastern Mexico and reaching its northern limit in Coahuila and Chihuahua, where it grows with the related *C. alabamensis* and, at times, is separated with difficulty from that more northerly ranging species. Palmer reports that small bunches of this fern are sold in the market at Saltillo under the name "Sanguinaria," a decoction of the plant being drunk "to purify the blood."

Cheilanthes aemula Maxon, *Contr. U. S. Nat. Herb.* **10**: 495 (1908).

COAHUILA: Sierra Guajes, Cañon Milagro, on cliffs, not common, *Stewart* 1710;

Mt. Caracol, 1880, *Palmer 1412*; Sierra Hechiceros. Cañon Indio Felipe, base of talus-slope, not common, *Stewart 155*.

Ranging from Texas (escarpment of Edwards Plateau) south through eastern Coahuila and the Sierra Madre of Nuevo Leon and Tamaulipas to eastern San Luis Potosi.

Cheilanthes horridula Maxon, Amer. Fern. Jour. **8**: 94 (1918).

Cheilanthes aspera Hook. Sp. Fil. **2**: 111. *t. 108a* (1852), non Kaulf. (1831).

COAHUILA: Mountains 24 mi. northeast of Monclova, 1880, *Palmer 1422*; hillside 2 mi. west of Sacramento, road to Cuatro Cienegas, *Johnston 7092*; Sierra Gavia, 5 mi. north of Saucillo, under rocks on slope, *Johnston 7207*; Saltillo, Sierra del Pueblo, crevices, 1904, *Palmer 433* in pt.; General Cepeda, high bluff, *Palmer 326* in pt.; Picachos Colorados, under rocks below cliffs, *Johnston & Muller 112*; near Santa Elena, Sierra Cruces, limestone ledges, *Johnston & Muller 204*; south base of Picacho de San José, dry arroyo bank near gypsum exposures, *Johnston & Muller 816*; open limestone canyon, 6 mi. west of Viesca, *Johnston 7743*; Las Uvas, east side Valle Acatita, frequent, *Stewart 2697*. CHIHUAHUA: Bachimba Canyon, rocky hills, Oct. 31, 1885, *Pringle 447*; 11 mi. northeast of Camargo, lava cliff, *Johnston 7903a*. DURANGO: 23 mi. north of Zaragoza, under sandstone rocks on slope, *Johnston 7793*; Raymundo Hill, Lerdo, alt. 1650 m., Nov. 25, 1911, *Chaffey 58* in pt.

A local and rather rare species, ranging from central Texas to southwestern New Mexico and Durango.

Cheilanthes moncloviensis Baker, Ann. Bot. **5**: 210 (1891).

COAHUILA: Soledad, Sept. 1880, *Palmer 1378* (ISOTYPE).

Known also from Puebla.

Cheilanthes Wrightii Hook. Sp. Fil. **2**: 87. *t. 110a* (1852).

COAHUILA: Near Santo Domingo, igneous hill, *Wynd & Mueller 472*; Sierra Cruces, Cañon Tinaja Blanca, common among grass on sunny open gravelly terrace in upper canyon, *Johnston & Muller 288*; Sierra Cruces, crest north of Puerto Bajito at head of Cañon Tinaja Blanca, common on grassy sunny rocky slope, *Stewart 1949*. CHIHUAHUA: Sierra Virulento, about rocks on crest of ridge, *Johnston 8073*; 8 mi. northwest of Cruces, sandstone cliff, *Johnston 7985*; Sierra Encinillas, 6 mi. north of Fierro, among rocks on hillside, fairly common, *Stewart 794*; rocky hills northwest of Chihuahua, Oct. 7, 1885, *Pringle 445*; 11 mi. northeast of Camargo, about lava cliff, *Johnston 7903*.

Arizona to Texas and south to Durango. In our area the species is confined to areas with igneous rocks and frequently grows with short grass on sunny gravelly terraces and slopes.

Cheilanthes meifolia D. C. Eaton, Proc. Am. Acad. **18**: 185 (1883).

COAHUILA: Rancho Agua Dulce, wooded canyon on eastern slope of Sierra San Manuel, *Wynd & Mueller 350*.

Known also from Nuevo Leon, Tamaulipas, and San Luis Potosi.

Cheilanthes Feei Moore, Ind. Fil. p. xxxviii (1857).

COAHUILA: Cañon Chojo Grande, 27 mi. southeast of Saltillo, growing out of small hole in an exposed rock at base of canyon, 1904, *Palmer 374*; Saltillo, exposed rocks, 1904, *Palmer 432*; Puerto Colorado, faces of sandstone cliffs, *Johnston 8693*; San José, crevices of north-facing basalt crags on slope, fronds flat against rock, *Johnston & Muller 981*. CHIHUAHUA: Sierra Almagre, near Ojo del Almagre, crevices on dry cliff of volcanic rock, fronds closely appressed against rock, *Johnston & Muller 1205*.

Widely distributed in western United States and extending south into adjacent Mexico.

Cheilanthes tomentosa Link, Hort Berol. **2**: 42 (1833).

COAHUILA: Sierra Hechiceros, Cañon Indio Felipe, about rocks in deep wooded canyon, *Stewart* 130 and 137, *Johnston & Muller* 1363; Rancho Agua Dulce, Sierra San Manuel, dry arroyos, *Wynd & Mueller* 337. CHIHUAHUA: Chihuahua, northwestern hills, Oct. 23, 1885, *Pringle*.

Ranging from Virginia and Georgia west to Arkansas and Arizona, and south into northern Mexico.

Cheilanthes castanea Maxon, Proc. Biol. Soc. Wash. **32**: 111 (1919).

COAHUILA: Sierra Guajes, Cañon Milagro, on cliffs, not common, *Stewart* 1711; Soledad, 1880, *Palmer* 1390 in pt.; Caracol Mt., 1880, *Palmer* 1391 in pt.; Saltillo, Apr. 1880, *Palmer* 1391; mountains 6 mi. east of Saltillo, July 1880, *Palmer* 1398; Carneros Pass, ledges, *Pringle* 2777; Carneros Pass area, 1880, *Palmer* 1390 (ISOTYPE); Sierra del Pino, La Noria, shady bushy arroyo-bank, *Johnston & Muller* 477; Sierra del Pino, high western ridge about 10 mi. north of La Noria, under rocks on crest, *Johnston & Muller* 553; Sierra Madera, Cañon del Agua, rock crevices in moist densely wooded canyon, *Muller* 3252b; Sierra Madera, Cañon Charretera, moist bushy ledges and shaded arroyos, *Johnston* 8931 and 9095; Sierra Cruces, Cañon Tinaja Blanca, shaded banks in open canyon, *Johnston & Muller* 283; Sierra Mojada, Cañon Hidalgo, slopes of canyon below crest, *Stewart* 1057; Sierra Jimulco, 10 km. northeast of Jimulco, *Stanford et al.* 43. ZACATECAS: Concepcion del Oro, high up in canyon in shady moist places, 1904, *Palmer* 260 in pt.; Concepcion del Oro, 1902, *Palmer* 388; mountain 18 km. west of Concepcion del Oro, *Stanford et al.* 577.

Ranging from Texas to Arizona and south to Zacatecas and Hidalgo.

Cheilanthes Eatonii Baker, Syn. Fil. 140 (1867).

COAHUILA: Soledad, 1880, *Palmer* 1394, 1395, 1396; east of La Rosa, *Wynd & Mueller* 43; hills near Saltillo, shaded clay bank in deep arroyo, 1898, *Palmer* 367; base of mountains southeast of Saltillo, road to Diamante Pass, limestone ledge, *Johnston* 7270; Carneros Pass area, 1880, *Palmer* 1397; 3 km. southwest of Fraile, in arroyo, *Stanford et al.* 341; Sierra Hechiceros, about rocks on sunny hillside at El Tule, *Johnston & Muller* 1308; Sierra Hechiceros, Cañon Indio Felipe, base of cliffs, not common, *Stewart* 131; south of Carricito, north-facing basalt ledges, *Johnston & Muller* 162; Sierra del Pino, Cañon Ybarra, dry hillside, *Stewart* 1875; Sierra del Pino, under rocks on ridge-crest 4 mi. northeast of La Noria, *Johnston & Muller* 653; Sierra Cruces, Cañon Tinaja Blanca, under rocks in lower canyon, *Johnston & Muller* 252; Sierra Cruces, lava crags at head of Cañon Tinaja Blanca, *Johnston & Muller* 306; Picacho de San José, crevices of cliffs, *Stewart* 1112; San José, about basalt crags on hillside, *Johnston & Muller* 980; San Antonio de los Alamos, under large lava rocks in open upper canyon, *Johnston & Muller* 903; Sierra Negras, 9 km. south of Parras, *Stanford et al.* 202 in pt.; Sierra de Parras, July 1910, *Purpus* 4609. CHIHUAHUA: Sierra Santa Eulalia, Oct. 27, 1885, *Pringle*; rocky hills near Chihuahua, Oct. 1885, *Pringle* 455 in pt.; Meoqui, *LeSueur* 1147. ZACATECAS: Cedros, canyons, *Lloyd & Kirkwood* 139.

Ranging from Oklahoma and Texas west to Arizona and south to Durango and San Luis Potosi.

Cheilanthes jamaicensis Maxon, Contr. U. S. Nat. Herb. **24**: 51 (1922).

COAHUILA: Sierra de la Gloria, March 4, 1939, *Marsh* 1964; Sierra Madera, Cañon del Agua, abundant in rock-crevices in moist densely wooded canyon, *Muller* 3252; mountains 6 mi. east of Saltillo, 1880, *Palmer* 1418 in pt.

Here first reported from Mexico; previously known only from Jamaica and from Santo Domingo (var. *domingensis* C. Chr.). The geographical distribution of the species is unusual; one would not, off hand, expect a local West Indian species to appear, apparently just as locally, in the mountains

of northeastern Mexico. However, this is not unprecedented; *C. notholaenoides*, though much more common than *C. jamaicensis* in the Mexican highlands, similarly occurs in Jamaica and Hispaniola. Since its nearest relatives are Cordilleran, *C. jamaicensis*, in spite of its rarity on the mainland, may reasonably be classed with those continental species which have outlying stations in the West Indies.

Cheilanthes myriophylla Desv. Berl. Mag. **5**: 328 (1811).

CHIHUAHUA: Hills northwest of Chihuahua, cool cliffs, Oct. 16, 1886, *Pringle* 829. ZACATECAS: Concepcion del Oro, shaded moist places among rocks and bushes high in canyon, Aug. 1904, *Palmer* 260 in pt. and 258.

Ranging from our area to Durango and San Luis Potosi and along the Andes to Chile and Argentina. Differing from *C. villosa* in having the upper surface of the fronds glabrous (rather than bearing coarse hairs) and scales of the lower surface fibrillose.

Cheilanthes villosa Davenp. Cat. Davenport Herb. Suppl. 45 (1883).

COAHUILA: Sierra Guajes, Cañon Milagro, on cliffs, not common, *Stewart* 1709; gorge just east of Socorro, on cliffs, *Johnston* 8850; Sierra San Vicente, Cañon Espantosa, *Schroeder* 97; top of grade at Cuesta Zozaya, about rocks on dry open slopes, *Johnston* 9292; western extremity of Sierra Madera, deep canyon 2 km. southeast of Puertecito, ledges on canyon-wall, *Johnston* 9320; Sierra Cruces, basalt crags at head of Cañon Tinaja Blanca, *Johnston & Muller* 306; San José, about crags on basalt hill, *Johnston & Muller* 979; San Antonio de los Alamos, under basalt rocks in open canyon, *Johnston & Muller* 904; La Botica, limestone cliffs, scarce, *Stewart* 2895; Sierras Negras, 9 km. south of Parras, *Stanford et al.* 202 in pt.; Picacho de Jimulco, summit, *Stanford et al.* 106 in pt.; Jimulco, April 28, 1885, *Pringle*. CHIHUAHUA: Sierra Rica, Dec. 1882, *Newberry*; 8 mi. northwest of Cruces, about tuff cliff, *Johnston* 7978; Sierra Santa Eulalia, April 6, 1885, *Pringle*; Sierra Santa Eulalia, Nov. 2, 1885, *Pringle* 459; hills west of Chihuahua, about head of aqueduct, May 8, 1885, *Pringle*.

Ranging from trans-Pecos Texas (Davis Mts.) to southern Arizona, and south into our area.

Cheilanthes Lindheimeri Hook. Sp. Fil. **2**: 101. *t.* 107a (1858).

CHIHUAHUA: 1 mi. west of Poza de Villa, under rocks on small igneous hill, *Johnston & Muller* 1386; 3 mi. south of Pirámide, terrace along rocky arroyo, under rocks, *Johnston* 8113; 11 mi. northeast of Camargo, lava cliff, *Johnston* 7924; Chihuahua, rock-crevices, shady riverbank, 1908, *Palmer* 358.

Texas to Arizona and south to Sonora, Durango, and San Luis Potosi. In our region found only in areas of igneous rock.

Cheilanthes lendigera (Cav.) Sw. Syn. Fil. 128, 328 (1806).

CHIHUAHUA: Mapula Mts., southwest of Mapula station, central canyon on shaded ledges and cool cliffs, Oct. 21, 1886, *Pringle* 828 and 835.

Texas (Chisos Mts.); Arizona south along the western Sierra Madre, reaching northwestern South America.

Cheilanthes mexicana Davenp. Bull. Torr. Bot. Cl. **15**: 227 (1888).

CHIHUAHUA: Portrero Peak, Sierra Santa Eulalia, northeast of Mapula station, verge of a high cliff near the summit, Oct. 12, 1886, *Pringle* 827 (TYPE).

Only the type collection seen. Although, in describing the species, Davenport compared it with *C. viscida* and *C. Parishii*, it is much more

closely related to *C. lendigera* and *C. Schaffneri* Moore (*Myriopteris rufa* Fée, non *C. rufa* Don; *C. cinnamomea* D. C. Eaton). From the former it differs in its compact habit, smaller pinnules, and nearly rudimentary indusium. There seem to be no very satisfactory characters whereby to separate it from the latter as represented by *Schaffner* 911 and 914, from San Luis Potosi, referred to *C. cinnamomea* by Eaton; more material may show that *C. mexicana* should be reduced to synonymy under *C. Schaffneri*.

Cheilanthes pyramidalis Fée, Mém. Foug. 7: 38. t. 25, f. 3 (1857).

CHIHUAHUA: Mapula Mts., large central canyon southwest of Mapula station, cool rocky slopes, Oct. 1886, *Pringle* 832.

Previous students of ferns have usually treated *C. pyramidalis* as a synonym of *C. marginata*; even Fournier treated it as only varietally distinct. It is not a very strong species. True *C. marginata* of South America, however, has a broadly deltoid lamina, ovate to short-linear ultimate segments, and strongly ciliate indusia which are usually decurrent on the rachillae. *Cheilanthes pyramidalis* of Mexico is distinguishable by its narrowly deltoid to deltoid-lanceolate lamina and its strong tendency to develop elongate-linear ultimate segments. There is much variation in the degree of ciliation and decurrence of the indusium (in Fée's type, as he figures it, it is strongly ciliate but not at all decurrent), but it is always somewhat ciliate. The species has been collected in the western states of Mexico and in Vera Cruz and Guatemala, and apparently it reappears in Venezuela (*Fendler* 90). The geographic relationship between *C. pyramidalis* and *C. marginata* is not unlike that between *Notholaena nivea* and *N. incana*. At its extreme northern limit, *C. pyramidalis* passes into var. *arizonica* (Maxon) Broun, characterized by its slender habit, deltoid-ovate lamina, elliptical to oblanceolate ultimate segments, and merely papillate-denticulate, non-decurrent indusia.

Pringle's collection (832) from the Mapula Mts. does not have the elongate segments of typical *C. pyramidalis*, but it does possess relatively narrow fronds and ciliate, more or less decurrent indusia, and therefore it is referred to the typical variety rather than to var. *arizonica*. Maxon, Amer. Fern Jour. 8: 117 (1918), cites *Pringle* 1442 as intermediate in characters. There are two sheets of this collection in the Gray Herbarium, containing three individuals, two of which are very good *C. pyramidalis*. The third, though suggesting the variety, has the relatively narrow frond of the typical form, and the indusia, though only weakly decurrent, are definitely ciliate.

Cheilanthes Kaulfussii Kunze, Linnaea 13: 145 (1839).

CHIHUAHUA: Rocky hills northwest of Chihuahua, at base of cliffs in shade, *Pringle* 457 and 826.

Ranging from Central America north to Nuevo Leon, Durango, and Chihuahua; trans-Pecos Texas (Davis and Chisos Mts.).

Cheilanthes leucopoda Link, Fil. Sp. 66 (1841).

COAHUILA: Sierra Jimulco, 11 km. northeast of Jimulco, *Stanford et al.* 82; steep open north canyon, 6 mi. west of Viesca, *Johnston* 7745. CHIHUAHUA: Sierra Santa

Eulalia, in soil about ledges, 1885, *Pringle* 442. DURANGO: 7 mi. southwest of Chocolate, shaded slope, *Shreve* 9112.

From our area ranging south in Durango, reaching San Luis Potosi. It extends north to the southern escarpment of the Edwards Plateau in Texas.

Adiantum Capillus-Veneris L. Sp. Pl. 1096 (1753).

VERNACULAR NAMES: Culantrillo; Silantrillo.

COAHUILA: Muzquiz, *Marsh* 1138; Sierra Madera, Cañon del Agua, along edge of water in upper canyon, *Muller* 3249; Cuatro Cienegas, *Marsh* 2021; Saltillo, 1880, *Palmer* 1430; Saltillo, shady narrow arroyo, abundant on wet rocks, 1898, *Palmer* 71; Chojo Grande, 27 mi. southeast of Saltillo, common on wet canyon-wall and about waterfall, 1904, *Palmer* 360; Sierra Hechiceros, Cañon Indio Felipe, along creek and about waterfall, *Stewart* 72 and 129; Sierra Mojada, Cañon Hidalgo, shade in canyon below crest, *Stewart* 1062; El Coyote, eastern margin of Valle Acatita, frequent about spring, *Stewart* 2737; Cañon del Agua Grande west of Las Delicias, common on gypsum bank by water, *Stewart* 2801; San Lorenzo de la Laguna, 1880, *Palmer* 1431. CHIHUAHUA: Sierra Almagre, Ojo del Almagre, locally common about spring, *Johnston & Muller* 1210; Chihuahua, moist crevices on shaded river bank, 1908, *Palmer* 331. ZACATECAS: Cedros, *Lloyd & Kirkwood* 114.

Widely distributed in the warmer parts of both hemispheres. Palmer reported that this fern was sold in the market at Saltillo under the name "Silantrillo" and notes that it was "used to assist menstruations in females."

Adiantum tricholepis Fée, Mém. Foug. 8: 72 (1857).

COAHUILA: Hac. La Rosita, *Wynd & Mueller* 296; La Mariposa, *Wynd* 691. CHIHUAHUA: Sierra Santa Eulalia, April 1885, *Pringle*; rocky ledges in the hills northeast of Chihuahua, Oct. 10, 1885, *Pringle* 456.

Known from Texas (south escarpment of the Edwards Plateau), Tamaulipas, Coahuila, Nuevo Leon, Vera Cruz, Yucatan, Morelos, Guerrero, Jalisco, Sinaloa, and Chihuahua.

Polypodium peltatum Cav. Descr. 244 (1802).

Polypodium polylepis Roem. ex Kunze, *Linnaea* 13: 131 (1839).

COAHUILA: Mountain 24 km. northwest of Fraile, on a log, *Stanford et al.* 413.

Ranging northward along the eastern Sierra Madre from central and southern Mexico.

Polypodium erythrolepis Weatherby, Contr. Gray Herb. 65: 11 (1922).

COAHUILA: Cañon Sentenela, Sierra del Carmen, *Wynd & Mueller* 599 and 610; Sierra del Carmen, Aug. 26, 1936, *Marsh* 626 (US). CHIHUAHUA: Portrero Peak, northeast of Mapula station, cold cliffs, Sept. 10, 1886, *Pringle* 825 (TYPE).

Otherwise known from western Chihuahua, adjacent Sonora, and Durango. The above-cited collections from Coahuila, together with one from western Chihuahua (*LeSueur* 1128), go very far to break down the differences between *P. erythrolepis* and *P. peltatum*. In them, the abundant, ovate, deeply lacerate-margined scales of the former, which seemed so distinctive when it was proposed, nearly disappear and are replaced by suborbicular ones. The surviving distinctions are: *P. erythrolepis*, stipe nearly as long as the blade, costa green on the lower surface; *P. peltatum*, stipe conspicuously shorter than the blade, costa black on lower surface.

In addition, *P. erythrolepis* tends to have narrower rhizome-scales with narrower, more definitely erose-serrulate hyaline margins; but this is only a tendency. Furthermore, the collection here cited under *P. peltatum* (*Stanford et al.* 413) is also transitional in that the costa, though somewhat darker than the leaf-tissue, is green beneath and the orbicular scales of the under surface of the lamina are more or less erose-serrulate. In all probability, *P. erythrolepis* would best be treated as a variety of *P. peltatum*.

Polypodium guttatum Maxon, Contr. U. S. Nat. Herb. **17**: 575 (1916).

VERNACULAR NAME: Canahuala.

COAHUILA: Sierra del Carmen, Cañon Sentenela, *Wynd & Mueller* 553; Sierra Madera, Cañon Charretera, on rocks in moist shaded canyon under oaks at lower edge of pine-belt, *Johnston* 8985; shady canyon near Saltillo, abundant, 1898, *Palmer* 65 (ISOTYPE); medicinal herb bought in Saltillo market, 1898, *Palmer* 65½; Carneros Pass area, 1880, *Palmer* 1373; mountain 25 km. northwest of Fraile, *Stanford et al.* 371.

Ranging from Hidalgo and Guanajuato northward along the eastern Sierra Madre into eastern Coahuila; Oaxaca; Baja California. Palmer reports this plant as sold in the market at Saltillo. Infusions are drunk as tea and used externally as a remedy for pain in the joints and particularly those of the shoulder.

Polypodium plesiosorum Kunze var. ***Bakeri*** Davenp. Garden and Forest **4**: 556 (1891).

COAHUILA: Sierra de la Gloria, *Marsh* 1926.

Known from Michoacan, Jalisco, and Nuevo Leon.

Polypodium polypodioides (L.) Watt, var. ***Michauxianum*** Weatherby, Contr. Gray Herb. **124**: 31 (1939).

COAHUILA: Sierra San Manuel, Rancho Agua Dulce, *Wynd & Mueller* 368; Caracol Mts., 1880, *Palmer* 1376; Saltillo, Sierra del Puebla, shaded crevices of detached rocks about summit, Nov. 3, 1904, *Palmer* 447.

Ranging from Maryland, Illinois, and Missouri southward and through eastern Mexico to Guatemala.

Polypodium thyssanolepis A. Br. ex Klotzsch, Linnaea **20**: 392 (1847).

CHIHUAHUA: Cold cliffs in rocky hills northeast of Chihuahua, Oct. 26, 1885, *Pringle* 443.

Ranging from southern Arizona to western Texas (Chisos Mts.) and southward to Costa Rica and Andean South America.

SCHIZEACEAE

by C. A. WEATHERBY

Anemia mexicana Klotzsch, Linnaea **18**: 526 (1844).

COAHUILA: Rancho Agua Dulce, Sierra San Manuel, *Wynd & Mueller* 319; Hac. Mariposa ravine near Puerto Santa Anna, *Wynd & Mueller* 229; Caracol Mt., 1880, *Palmer* 1438.

Ranging from central Texas south to Hidalgo and Morelos.

MARSILIACEAE

by C. A. WEATHERBY

Marsilea Fournieri C. Chr. Ind. Fil. 418 (1906).

Marsilea minuta Fourn. Bull. Soc. Bot. France **27**: 329 (1880), non L. (1771).

COAHUILA: Cerro de Cypriano, July 1910, *Purpus* 4525. CHIHUAHUA: Wet places near Chihuahua, *Pringle* 1121.

The species is also known from San Luis Potosi and Jalisco. The Mexican material of *Marsilea* at hand is scanty and often without fruit or otherwise unsatisfactory; determinations in the genus are therefore tentative and subject to correction.

Marsilea mucronata A. Br. Am. Jour. Sci. II. **3**: 55. f. 2 (1847).

COAHUILA: Torreon, 1898, *Palmer* 467.

As Braun has suggested, *M. mucronata* may be no more than a variety of *M. vestita*. Baker so treated it, but without making the proper nomenclatural combination. The two are geographically separated, *M. vestita* on the Pacific Slope, *M. mucronata* in the high plains and eastern Rockies with outlying stations in the Great Basin. Within these areas the characters of pubescence given by Braun, the relatively abundant, long, slender and somewhat spreading hairs of *M. vestita*, the sparse, short, broad and appressed hairs of *M. mucronata*, hold so consistently that it seems much more natural to give *M. mucronata* some recognition than to reduce it outright to *M. vestita*, as has commonly been done in recent years.

The species ranges from southern Saskatchewan and Alberta south to Texas, New Mexico, and Arizona. Wright (2112) collected the species in low ground near San Elizario, Texas. It is to be expected elsewhere in the low ground along the Rio Grande at our northern boundary.

Marsilea sp.

CHIHUAHUA: Pond just east of Organos, growing in water up to a foot deep, blades floating on surface of pond, common, *Stewart & Johnston* 2048; Rio Conchos near Camargo, *White* 2244.

The two above-cited specimens are sterile. They suggest both *M. uncinata* and *M. mexicana* but are not definitely determinable.

PSILOTACEAE

by C. A. WEATHERBY

Psilotum nudum (L.) Griseb. Abh. Ges. Wiss. Göttingen **7**: 278 (repr. 130) (1857).

CHIHUAHUA: Hills about 8 mi. northeast of Chihuahua, growing from seams of rock in canyon, Oct. 1885, *Pringle* 450.

EQUISETACEAE

by C. A. WEATHERBY

Equisetum laevigatum A. Br. Am. Jour. Sci. **46**: 87 (1844).

COAHUILA: Muzquiz, *Marsh* 229 and 473; Sierra Hechiceros, Cañon del Indio Felipe, sand at edge of creek, scarce, *Stewart* 36.

Widely ranging in the United States and extending south through Mexico to Guatemala.

SELAGINELLACEAE

by C. A. WEATHERBY

Selaginella rupincola Underw. Bull. Torr. Bot. Cl. **25**: 129 (1898).

COAHUILA: Sierra Cruces, Cañon de Tinaja Blanca, ledges of igneous rock, stems ascending, *Johnston & Muller* 307. CHIHUAHUA: 20 km. north of Chihuahua, vol-

canic hills, rocky talus at base of cliff, more or less erect, *Stewart & Johnston* 2122; Chihuahua, 1908, *Palmer* 38 in pt.; Sierra Azul, southwest of Mapula, crevices of igneous rock, *Pennell* 18646 (US); Meoqui, 1936, *LeSueur* 1146.

Arizona and western New Mexico south along the western Sierra Madre to Durango and Guanajuato. A species apparently confined to igneous rocks. Its stems are assurgent to nearly erect and are ascendingly branched. The shoots are symmetrical and equally clothed on all sides by appressed leaves. The leaves are terminated by elongate white setae which form a conspicuous tuft at the end of sterile shoots.

Selaginella viridissima Weatherby, sp. nov.

Caules graciles, foliis inclusis circa 1 mm. diametro, elongati (ad 15 cm. longi), prostrati tegetem magnam intricatam laxam formantes, parce radicales, bi- vel tripinnatim ramosi (spatiis inter ramos 1 cm. vel minus), ramulis plerumque brevibus (1 cm. vel minus longis). Folia uniformia, arcte adpressa, saturate viridia, plana vel leviter convexa, oblongo-lineararia, acuta vel obtusiuscula, plerumque 1.6–2 mm. longa, 0.3–0.4 mm. lata, dorso anguste sulcata, utroque margine ciliis brevissimis 0.1 mm. vel minus longis folii apicem versus ad denticulos reductis praedita. Seta terminalis nulla. Spicae apice caulis ramorumque gestae usque ad 1 cm. longae. Sporophylla ovato-deltaidea, acuminata, e basi leviter dilatata subsagittata subabrupte in acuminem longam contracta, convexa, utroque margine crebre minuteque serrulato-ciliolata, 1.8–2 mm. longa, 0.3–0.4 mm. lata, sulcae medianae utroque latere vitta pallida ornata, sine seta terminali. Macrosporangia microsporangia intermixta. Macrospori 0.4–0.45 mm. diametro, flavi, dense leviterque reticulato-rugosi. Microspori aurantiaci, circa 40 μ diametro.

COAHUILA: Tinajas de los Osos, west end of Sierra Fragua, 2–3 km. north of Puerto Colorado, forming mats in shaded canyon, Sept. 1, 1941, *Johnston* 8683; Sierra Mojada, Cañon Calabasa, fairly common on shaded cliffs 100 m. below the crest, hanging in mats 1 m. in diameter, Oct. 27, 1941, *Stewart* 2204 (TYPE, Gray Herb.).

A plant with slender elongate much branched trailing stems forming loose mats. The minute dark green leaves are acute, devoid of setae, and closely appressed to the rather wiry elongate stems. It grows on limestone at the two stations where it has been collected. A pretty species, related to *S. extensa* and *S. Sartorii*, from both of which it may be distinguished by its muticous leaves. From *S. mutica* and its immediate allies, *S. viridissima* differs in its much longer, relatively narrower, and plane leaves.

Selaginella macrathera Weatherby, sp. nov.

Caules repentes, ad 8 cm. longi, usque ad apicem parce radicales, foliis inclusis circa 1.5 mm. diametro, bipinnatim crebreque ramosi (spatiis inter ramos ca. 5 mm.). Folia uniformia, laxe adpressa, subpallide viridia, oblongo-lineararia, seta exclusa plerumque 1.8–2.2 mm. longa, 0.3–0.4 mm. lata, acuta, ventro plana, dorso leviter convexa conspicue angusteque sulcata, basi fasciculum pilorum brevium ciliis marginalibus similium margine utroque 10–12 ciliis brevissimis 0.1 mm. vel minus longis apicem folii versus ad denticulos hyalinos reductis praedita, apice in setam gracilem 1–1.4 mm. longam scabriusculam desinentia. Spicae ad 1 cm. longae apice caulis ramorumque superiorum gestae. Sporophylla anguste deltaidea, 1.8–2 mm. longa, basi leviter sagittata 0.6–0.8 mm. lata, valde convexa

vix carinata, dorso leviter sulcata, marginibus breviter crebreque serrulato-ciliolata, seta ut in foliis praedita. Megasporangia absentia vel pauca, unicum visum apicem versus spicae gestum. Megaspori visi immaturi vel male evoluti aurantiaci, circa 0.3 mm. diametro, latere commisurali leviter, latere altero valde crasseque reticulato-rugosi. Microsporangia multa; microspori aurantiaci, ca. 40 μ diametro, irregulariter tuberculati.

CHIHUAHUA: Sierra del Virulento, 2-3 mi. east of Rancho Virulento, ledges on north-facing lava cliffs, common and forming mats, Aug. 11, 1941, *Johnston 8067* (TYPE, Gray Herb.).

A plant with creeping stems. The shoots are symmetrical and equally clothed on all sides with appressed leaves bearing a very long white terminal seta. In spite of its repent habit, the species apparently belongs to the group of *S. rupicola*, from all members of which it is distinguished by its combination of very short cilia and very long terminal seta.

Selaginella Wrightii Hieron. *Hedwigia* **39**: 298 (1900).

COAHUILA: El Berrendo, July 13, 1939, *Harvey 1173* (US); Sierra Gavia, 5 mi. north of Saucillo, rocky ledge, *Johnston 7208*; Sierra San Vicente, Cañon Espantosa, *Schroeder 72*; Saltillo, *Nil 10644* (US); Sierra del Pino, 4 mi. northeast of La Noria, about limestone rocks along crest of ridge, *Johnston & Muller 651*; western extremity of Sierra Madera east of Laguna de Leche, mats about limestone ledges in abrupt open canyon, *Johnston 8607*; Sierra Madera, Cañon Charretera, carpeting limestone ledges by tinaja, *Johnston 9106*; Cañon de Jara, just east of Socorro, mats about base of limestone cliffs, *Johnston 8854*; Sierra Mojada, April 19, 1892, *Jones 485* (US); 5 km. south of Sierra Mojada, *Harvey 1265a*. CHIHUAHUA: Sierra Almagre, moist limestone ledges in shaded canyon, *Johnston & Muller 1192*; east slopes of Sierra Santa Eulalia 2 km. north of San Antonio, *Harvey 1507*. ZACATECAS: Cedros, stony hills, *Lloyd & Kirkwood 142*; *Lloyd 20* (US).

Ranging from the Edwards Plateau and its escarpments, in Texas, west to southeastern New Mexico, and south through our area and the mountains of northeastern Mexico to San Luis Potosi, and possibly to Puebla. The type specimen, *Wright 829*, was collected June 25, 1849, "on hills near Turkey Creek, on flat rocks slightly covered with earth." This locality is near the present town of Cline, in western Uvalde County, Texas. The species appears to grow only on limestone. It is a creeping plant carpeting the ground under sheltering rocks or on ledges on north-facing cliffs. The erect fruiting spikes, 1-3 cm. long, are commonly produced in great abundance. The rather firm leaves have a short slightly tawny terminal seta. The leaves tend to be laterally arranged and the shoot is hence somewhat dorsi-ventral.

Selaginella Sheldoni Maxon, *Proc. Biol. Soc. Wash.* **31**: 171 (1918).

COAHUILA: Picacho de Jimulco, summit, 13 km. east of Jimulco, *Stanford et al. 118*. CHIHUAHUA: Chihuahua, 1908, *Palmer 38* in pt.

Southwestern Oklahoma, central and western Texas, and New Mexico. A creeping species with somewhat dorsi-ventral shoots. The leaves tend to be laterally spreading, and are terminated by a slender elongate white seta. Most of the known stations for the species are in areas of igneous rock.

Selaginella Parishii Underw. *Bull. Torr. Bot. Cl.* **33**: 202 (1906).

COAHUILA: Saltillo, *Nil 105* (US); Cerro Vega, west of Saltillo, crevices of sand-

stone, *Pennell* 17272 (US); mountains near Saltillo, June 1909, *Nil* (US). ZACATECAS: Near Concepcion del Oro, sheltered rocky ledges, plant very dark green, 1904, *Palmer* 306 (ISOTYPE); Tarey Canyon, near Cedros, clefts of slate rock, Feb. 7, 1911, *Chaffey* 58 (US).

An endemic species with relatives in southern Mexico and southwestern United States (cf. Maxon, *Smithsonian Misc. Coll.* **72**: no. 5, p. 4. 1920). A prostrate repent plant with strongly dorsi-ventral shoots. The rather broad and thin acute leaves, without setae, are laterally widely spreading under favorable conditions but curve upward and become more or less connivent when dry.

The specimens here associated with the type collection of *S. Parishii* differ from it somewhat in gross appearance, and at one time they were annotated by Dr. Maxon as constituting a possible new species. In details, however, they are very close to the Palmer isotype; the more conservative course is to leave them in *S. Parishii* pending a thorough revision of the Mexican species of this group.

Selaginella lepidophylla (Hook. & Grev.) Spring, *Monog. Lycopod.* **2**: 72 (1849).

VERNACULAR NAMES: Flor de la Peña; Siempre Viva.

COAHUILA: Muzquiz-La Mariposa, Dec. 5, 1936, *Marsh* 1041; Sierra Encantada west of Buena Vista, July 14, 1938, *Marsh* 1414; 6 mi. north of Hipolito, limestone outcrop on slope, *Johnston* 7236; La Rosa, dry mountain slope, *Wynd & Mueller* 45; General Cepeda, common under overhanging ledges, 1904, *Palmer* 327; Cuatro Ciénegas, *Marsh* 2056; Cañon de Jara east of Socorro, *Schroeder* 17; western base of Picacho del Fuste, north-facing bank of cemented gravels, common, *Johnston* 8442; south end of Cañada Oscuro near Tanque La Luz, steep slopes of escarpment, common on and off gypsum beds, *Johnston* 8494; west end of Sierra Fragua, Aguaje del Pajarito, north-facing limestone slopes, *Johnston* 8806; Cañon Blanco, Sierra Margaritas, open slopes, common, *Stewart* 2914. CHIHUAHUA: Sierra San Carlos, road to mine, on cliff near canyon mouth, *Johnston & Muller* 41. ZACATECAS: Cedros, rocky hills, *Kirkwood* 134.

Western Texas and New Mexico south to southern Mexico. A common plant on north-facing dry rocky slopes and ledges in limestone areas. The plant avoids the direct sun but grows in open situations in which it can only have water available during and for a short time after desert showers. Because it avoids direct sunlight and commonly occurs in abundance only on north-facing situations, it serves as a handy and rather reliable indicator of direction to a traveller in the desert mountains where it flourishes. During most of the year the plant is an inconspicuous brownish ball of brittle inrolled leaves as big as one's fist. Only after a rain, when the fronds unroll and reveal their green upper surfaces, forming flat bright green rosettes and magically bringing unexpected verdure to gray cliffs and banks, does one realize how common and abundant it is in a region. The plant is a slow growing perennial and probably grows for a good many years. Some old plants have their rosettes lifted as much as 5 cm. above the substratum by the accumulation of half decayed fronds of seasons past. A surprising amount of dirt and gravel collects within the rosette about the base of the old fronds.

Selaginella pilifera A. Br. *Ind. Sem. Hort. Berol. App.* 20 (1857).

Selaginella Pringlei Baker, *Handb. Fern Allies* 88 (1887).

Selaginella pilifera var. *Pringlei* (Baker) Morton, Amer. Fern Jour. **29**: 15 (1939).

COAHUILA: Yerda Spring, near Muzquiz, *Marsh* 270; Muzquiz-Mariposa, *Marsh* 1042; Saltillo, *Arsène* 10677 and *Palmer* 321 (US, fide Morton); western end of Sierra Fragua, high crest north of Puerto Colorado, common on shaded ledges, *Johnston* 8748. CHIHUAHUA: Sierra Santa Eulalia, March 30, 1885, *Pringle* 211 (isotype of *S. Pringlei*); Sierra Almagre, moist shaded limestone cliffs in deep canyon, *Johnston & Muller* 1140.

Western Texas and adjacent southeastern New Mexico south to northern Sonora, San Luis Potosi, Nuevo Leon, and northern Tamaulipas. Apparently confined to limestones. A plant with habit similar to *S. lepidophylla*, but with more slender, less rigid stems and paler green, bristle-tipped leaves. In western Coahuila and adjacent Chihuahua it is uncommon and found on sheltered moderately moist cliffs in the oak-belt, and not with *Yucca*, *Dasylirion*, *Hechtia*, *Euphorbia antisiphilitica*, *Notholaena sinuata*, etc., the associates of *Selaginella lepidophylla*, on the lower and open slopes of the mountains.

The type of *S. pilifera* is given as based on "Specimina Texana in montosis ad fluvium Rio Grande infra El Paso uno cum *S. lepidophylla* a cl. Wright anno 1849 collecta comm. Dr. G. Engelmann." In the Gray Herbarium there is only a single collection of *S. lepidophylla* made by Charles Wright during 1849. This is his no. 827, collected from "high rocky bluffs of Devils River, July 22, 1849" in southern Val Verde County, Texas. His field-notes for 1849 have no entry which can be identified as pertaining to another collection of this species. It is possible, therefore, that the type of *S. pilifera* actually was collected in Val Verde County, Texas, rather than near the Rio Grande (presumably in the Quitman Mts.) below El Paso, as originally stated.

Morton has discussed the relationship of *S. pilifera* and *S. Pringlei* and has concluded that these two species differ only in trivial details, the former having entire, the latter having minutely serrulate margins on the lateral leaves. Except for the type, all the material he cites as belonging to typical *S. pilifera* comes from eastern Coahuila, Tamaulipas, and Nuevo Leon. The material from trans-Pecos Texas, New Mexico, Chihuahua, and San Luis Potosi he places in the var. *Pringlei*. Recently, however, Stephen White (522) has collected material in the valley of the Rio Bavispe, in northeastern Sonora, which has distinctly serrulate leaves. Since the characters of leaf-margin are weak at best and are not geographically correlated, it seems best to permit *S. Pringlei* to subside into synonymy.

PINACEAE

Pinus cembroides Zucc. Abh. Akad. Wiss. München **1**: 392 (1832).

Pinus osteosperma Engelm. in Wislizenus, Mem. Tour Mex. 89 (1848).

VERNACULAR NAME: Piñon.

COAHUILA: Sierra Encantada, *Stewart* 1434, *Marsh* 1358; Sierra Madera, Cañon del Agua, *Muller* 3229; Sierra del Pino, *Johnston & Muller* 523, *Stewart* 1243; Sierra Gavia, *Wynd & Mueller* 165, *Muller* 3064; Sierra San Vicente, Cañon Espantosa, *Schroeder* 95; 6 mi. east of Saltillo, 1880, *Palmer*; Chojo Grande near Saltillo, 1905, *Palmer* 768; Buena Vista, *Gregg*; Carneros Pass., *Pringle* 2659 and 4018, *Palmer*; near

General Cepeda, on mesa, *Pringle* 13664; summit of Picacho de Jimulco, *Stanford et al.* 110. CHIHUAHUA: Sierra Rica, *Stewart* 2506; Sierra Diablo, *Stewart* 933.

From Arizona, New Mexico, and trans-Pecos Texas south to Hidalgo. A small tree, usually 5–10 m. tall, commonly growing along arroyo-banks, on ridges, and on steep open slopes, usually associated with *Juniperus*. In western Coahuila and eastern Chihuahua the tree is seldom abundant in any locality.

Pinus Pinceana Gordon, *Pinetum* 204 (1858); Shaw, *Gard. Chron.* III. **38**: 122. fig. (1905), *Pines of Mexico* 7. tab. 2 (1909).

Pinus latisquama Engelm. *Gard. Chron.* II. **18**: 712. fig. (1882).

COAHUILA: West end of Sierra Fragua just north of Puerto Colorado, abundant, *Johnston* 8735; Sierras Negras, 9 km. south of Parras, *Stanford et al.* 148; General Cepeda, *Nelson* 6140; Carneros Pass, *Palmer* 1299 in 1880 (type of *P. latisquama*), *Pringle* 2293 and 13207A, *Shaw*. ZACATECAS: Pico de Teira, southwest of Cedros, 1908, *Lloyd* 30.

This very well marked pinyon-pine is known only from scattered stations in our area, and from Hidalgo and the peak of Orizaba in east-central Mexico. In our region it was first collected in March 1880, in the Carneros Pass area by Palmer. His material became the type of *Pinus latisquama* Engelm. The trees, which rarely become more than 7 m. tall, have a broad rounded crown whose silhouette from a distance is more suggestive of an oak tree than a pine. The ellipsoidal cones, russet when fully ripe, are borne on stalks and at the ends of the long supple brittle pendulous branchlets. The trunk becomes 2–6 dm. thick and commonly branches less than 2 m. above the ground. The bark is grayish, somewhat furrowed on the trunk and smooth on the branches. Where it has been found, the pine grows with scrub oaks and is confined to sheltered slopes and canyons.

Pinus Ayacahuite Ehrenb. ex Schlechtend. *Linnaea* **12**: 492 (1838).

VERNACULAR NAMES: Acanita; Pinaveta.

COAHUILA: Sierra del Carmen, Cañon Sentenela, *Wynd & Mueller* 630; Sierra del Carmen, Sept. 12, 1936, *Marsh* 821; Sierra Madera, *Muller* 3210, *Johnston* 8998; Carneros area, March 1880, *Palmer*; sierra 26 km. northwest of Fraile, *Stanford et al.* 456; General Cepeda, *Nelson* 6136.

I have seen cones for only one of the cited collections, *Johnston* 8998. This has seeds with the wing at least 10 mm. long. The form of the species growing in the western Sierra Madre, from Arizona to Durango, has the wing on the seeds only a few millimeters in length and has been distinguished from the typical plants under the name var. *brachyptera* Shaw (= *P. strobiformis* Engelm.). Some plants from the Sierra Madre of Nuevo Leon (*Muller* 1244, 2283) also have seeds with very short wings. The variety is probably also represented in Coahuila.

The species, with its varieties, ranges from Central America northward along the eastern Sierra Madre into Coahuila and along the western Sierra Madre into Arizona. It commonly attains a height of 15 m. and in favorable situations may approach 30 m. In Coahuila it associates with *Pseudotsuga* to form the forests on cool shaded north-slopes in the higher mountains. Along canyons and on open slopes its lower altitudinal limit is several hundred meters above that of *Pinus arizonica* and about 100 m. below that of *Pseudotsuga*.

Shaw, Pines of Mexico 12 (1909), reports *Pinus flexilis* from the mountains south of General Cepeda upon the basis of *Nelson 6136*. That specimen, in my judgment, appears referable to *P. Ayacahuite*. It has seeds with a broad wing about 8 mm. long, according to Shaw's manuscript notes.

Pinus Greggii Engelm. ex Parlatore in DC. Prodr. **16**²: 396 (1868); Shaw in Sargent, Trees and Shrubs **2**: 53. *tab.* 124 (1907); Shaw, Pines of Mexico 28. *tab.* 21 (1909).

COAHUILA: San Antonio de los Alanzanes, abundant, 30–50 ft., Aug. 31, 1848, *Gregg 402* (ISOTYPE); Cañon de las Iglesias, near Saltillo, *Shaw, Pringle 10142*.

A species known only from the Sierra Madre of Nuevo Leon and adjacent Coahuila, and perhaps Hidalgo. It is a 3-needle pine with sessile reflexed long-persistent tardily opening cones 6–12 cm. long. The cones are light colored (usually café au lait) and lustrous. The needles are very slender and 7–10 cm. long.

Pinus arizonica Engelm. in Wheeler, Rep. U. S. Geol. Surv. W. of 100th Merid. **6**: 260 (1878).

VERNACULAR NAMES: Pino; Pino Real.

COAHUILA: Sierra del Carmen, Cañon Sentenela, *Wynd & Mueller 650*; Sierra del Carmen, Sept. 12, 1936, *Marsh 830*; west of Buena Vista [?Sierra Encantada], *Marsh 2290*; Sierra del Pino, *Johnston & Muller 446*; Sierra Madera, *Muller 3208, Johnston 8935*; Sierra Gloria, *Marsh 1931*; Sierra Caracol, 1880, *Palmer*; Chojo Grande near Saltillo, 1905, *Palmer 769*; Carneros area, *Palmer, Pringle 2826*; mountains south of General Cepeda, *Shaw, Pringle 10139*.

Widely distributed and frequently the dominant pine in the eastern Sierra Madre of Nuevo Leon and Tamaulipas, south at least to Miquihuana and Doctor Arroyo. Also in the Chisos Mts. of Texas, southern New Mexico and Arizona, and northeastern Sonora. In northeastern parts of Mexico this pine has passed mostly as *P. Montezumae*, *P. pseudostrobus*, and *P. ponderosa*. Watson, Proc. Am. Acad. **18**: 158 (1883), reported it from Coahuila as *P. Montezumae* and *P. teocote*. I am unable to separate the pine of Coahuila and the eastern Sierra Madre from typical *P. arizonica* of Arizona. Sudworth, Pine Trees of the Rocky Mts. Region, U. S. Dept. Agr. Bull. **460**: *tab.* 16, 17 (1917), gives an excellent illustration of the Arizonan plant. It agrees perfectly with Coahuilan material. In general appearance the Coahuilan plant much resembles forms of *Pinus ponderosa* growing in the Rocky Mountains. Its bark is the same. It differs from *Pinus ponderosa* in its somber brownish (rather than russet), more or less asymmetric, frequently stalked cones, weak, non-pungent umbo on the cone-scales, 3–5 needles, usually glaucescent branchlets, and more southern distribution. From *P. Montezumae* our tree differs in its smaller and proportionately broader cones, usually glaucescent branchlets, and northern range. From *P. pseudostrobus* it differs in its coarser more rigid non-pendulous foliage, more rigid and woody short-stalked or sessile cones, and northern distribution. In northeastern Mexico *P. arizonica* is to be confused only with *P. Hartwegii*, a tree of high altitudes in the Sierra Madre, which has very coarse loose needle-sheathes, conspicuous long-persistent bud-scales, non-glaucescent branchlets, somewhat thinner less rigid cone-scales, and cones averaging slightly smaller.

In Coahuila *P. arizonica* is probably the most common pine, forming open forests in the open valleys and on the drier slopes and ridges in the higher mountains. From its selections of habitats it appears to be intolerant of shade. It commonly grows 10–20 m. tall, with a clear trunk 4–10 dm. thick for a quarter or third of its total height.

Pseudotsuga taxifolia (Lam.) Britt. Trans. N. Y. Acad. Sci. **8**: 74 (1889).

VERNACULAR NAMES: Guayamé; Hallarín.

COAHUILA: Sierra del Carmen, Cañon Sentenela, *Wynd & Mueller* 632; Sierra del Carmen, Sept. 12, 1936, *Marsh* 822; Sierra Madera, *Muller* 3221, *Johnston* 8995; Sierra Gloria, *Marsh* 1885; Carneros area, March 1880, *Palmer*; mountains 26 km. northwest of Fraile, *Stanford et al.* 451.

Growing on slopes and along canyons in cool shaded places in the higher mountains, forming trees 10–30 m. tall. From Hidalgo extending north in the eastern Sierra Madre into our area, and north into the Chisos Mts. of Texas. Widely distributed in western United States.

***Abies* sp.**

VERNACULAR NAME: Huallame.

COAHUILA: Vicinity of Carneros Pass, tree 40 ft. tall, 18 inches diameter, "Huallame," March 1880, *Palmer*; 26 km. northwest of Fraile, top of mountain with *Pinus* and *Pseudotsuga*, tree 30–40 ft. tall, trunk 18 inches thick, July 1941, *Stanford et al.* 457.

The two collections are unaccompanied by cones. They appear to be identical, however, with a very distinct *Abies* collected, in 1938, by Prof. Maximino Martínez in the Sierra Madre near Santa Catarina, between Monterey and Saltillo. The new species involved will soon be published in Mexico City. The foliage of the present species is not distichous. Its numerous crowded short rigid leaves ascend from all sides of the coarse branchlets in a manner more suggestive of a *Picea* than an *Abies*. Its short leaves bear numerous stomates on the flattened or broadly convex upper surface, and their vascular bundles, though clearly juxtaposed, remain distinct for most of their length. The hypoderm seems unusually well thickened under the middle third of the lower leaf-surface. These are all characters which permit the species to be quickly distinguished from *A. religiosa*, of central Mexico, and from the other, unnamed, Coahuilan species of the genus, the only Mexican plants to be confused with it. Among the species found in the United States, the present fir most suggests *A. lasiocarpa*. That northern high altitude species, however, has more pointed less regularly arranged leaves, whose resin-canals are large and distant from the lateral margins of the leaf. I doubt if it has any close relationship with the present Coahuilan species. It may be noted that Palmer's collection from "the Sierra Madre 40 miles south of Saltillo," cited as *Abies religiosa* by Watson, Proc. Am. Acad. **18**: 158 (1883), and by Rehder, Jour. Arnold Arb. **20**: 283 (1939), is identical with the Palmer collection which I have cited with more explicit geographical data above.

***Abies coahuilensis* sp. nov.**

Arbor ad 30 m. alta habitum *Pseudotsugae taxifoliae* simulans; trunco ad 9 dm. crasso in parte inferiore cortice fusco rugoso crasso praedito, in

parte superiore pallido sublevi; ramulis brunneis hirtellis eos *A. religiosae* simulantibus; foliis subdistichis e ramulis sub angulo 60–90° abeuntibus linearibus, 15–25 (saepe ca. 20) mm. longis, 1–1.7 mm. latis, supra basim coriaceis et saepe subtortis et curvatis, apice rotundis vel acutiusculis, supra viridibus plus minusve nitidis sulcatis sparsissime vel haud stomatosis, subtus conspicue bisulcatis costa prominente margine recurvo seriebus stomatum 4–5 congestis, intus canalibus resiniferis solitariis subepidermalibus ad utrumque marginem faciei inferioris donatis, fascias fibrovasculares conjunctas gerentibus, hypodermate sub facie superiore folii interrupta solum sub epidermate partium marginum et partis mediae faciei inferioris continua donatis; strobilis subsessilibus subcylindricis ca. 10 cm. longis supra basim ca. 4 cm. diametro; squamis 24–28 mm. latis 14–19 mm. longis, margine exteriori hirtellis sursum curvatis, alis minute eroso-denticulatis, margine interiore fere recto utrisque lateribus basi unguis 4–6 mm. longi et sinibus rotundis 1–2 mm. profundis 2–3 mm. latis donatis; bractea squamae haud vel vix exserta quam squama 2/5–4/5 longa, apicem versus 6–7 mm. lata deinde basim versus gradatim attenuata, apice truncata erosa mucronata; seminibus 7–8 mm. longis, alis 12–13 mm. latis ca. 1 cm. longis.

COAHUILA: Corte Branco fork of Charretera Canyon, Sierra Madera, frequent above 7500 ft. alt., Sept. 14, 1941, *Johnston 9050*; head of La Pipa fork of Charretera Canyon, Sierra Madera, dense cool shady conifer forest on steep north slope, Sept. 13, 1941, *Johnston 9010* (TYPE, Arn. Arb.)

This fir is frequent in the dense conifer forests on the northern slopes of the main ridge of the Sierra Madera in the drainage of Charretera Canyon. The tree grows mixed with *Pinus Ayacahuite*, *Cupressus*, and *Pseudotsuga*, but it is very much less common than these other trees. In appearance it simulates the *Pseudotsuga* so closely that I was unable to distinguish them at any distance and was able to make positive identification in the field only after examining the terminal buds on the branchlets, observing cones or cone-axes on the trees, or discovering cones or cone-scales beneath the trees. Timber has been cut and dragged out of the forests of the Sierra Madera for many years. Questioning men who know the forests and have cut timber there, I could find no evidence that this *Abies* had ever been distinguished by the local people from the more common and very similar appearing *Pseudotsuga*, well known to them as "Guayamé."

This species, and the *Abies* previously listed, were recognized as unnamed species and were described before I learned that Prof. Maximino Martínez was at work on a monograph of the Mexican species of the genus. Material of the two species of *Abies* was sent Prof. Martínez, and from the notes, specimens, and photographs he so obligingly sent in return I was readily able to identify the species I report from the Carneros Pass area and from northwest of Fraile with his material from Santa Catarina which he will soon publish as a new species. With this identification Prof. Martínez agrees. We are in disagreement, however, regarding the identification of the *Abies* of the Sierra Madera. Prof. Martínez identifies it with material collected by J. H. Faull near El Salto, in southwestern Durango, which will be described as a new species in the near future.

Through the courtesy of Prof. Faull I have been able to make a detailed

study of his collections from El Salto which Prof. Martínez identifies with the present plant of the Sierra Madera. The Durango collections obviously represent a good undescribed species. Its vegetative characters suggest a relationship with *A. religiosa*. It differs from that species, however, in proportionately broader cone-scales and very short non-exserted bracts. In shape and size of the scales, bracts, and seeds, the Durango plant is very much like that from Coahuila. The vegetative characters, however, differ in a number of striking details. The Coahuilan plant has twigs which are dusky and duller brown in color, and which are not glabrous but evidently hispidulous. The leaves have a much thicker epidermis, are heavier and firmer in texture, and are green. They are not glaucous when young. Their petiolular base, better developed than in the Durango tree, is conspicuously erect, appressed to the stem below the middle, and above departing from the stem in an abrupt curve. The leaves of the Durango species are usually straight or nearly so and spread from their point of attachment. The Coahuilan tree has the lower surface of the leaf with very prominently thickened midrib and margins, and accordingly very deeply and narrowly bisulcate. The lower surface of the leaf of the Durango tree has a very much less thickened and prominent midrib and margins, and the intervening grooves are shallow and broad, bearing 4–10 rows of stomates. The upper leaf-surface in the Coahuilan plant bears few if any stomates, whereas that from Durango has several rows of them down the middle.

In gross appearance the plants also differ. Specimens of the Durango plant are suggestive of *A. religiosa*. Those of the Coahuilan tree suggest *Pseudotsuga* or some the *Abies* of the United States. The habit of the trees appear to differ also. Professor Faull tells me that the tree at El Salto has a distinctive local name, is well known and distinguished by the local people, and has the characteristic habit permitting it to be instantly recognized as an *Abies*. The Coahuilan tree grows intermixed with *Pseudotsuga* and simulates that tree to a truly remarkable degree. The two have not been distinguished by local people knowing the forests, and I must confess that I should not have been aware that an *Abies* was growing with *Pseudotsuga* in the Sierra Madera had I not chanced upon *Abies* cones cut down by squirrels.

Geographical distribution also suggests that distinct species of *Abies* are present in the Sierra Madera and about El Salto. The flora of the coniferous forests of the Sierra Madera is made up largely of species that have migrated along the Sierra Madre Oriental or have extended south from the United States by other routes. There is some evidence that a small proportion of the species may have reached the Sierra Madera by migrations from the Sierra Madre Occidental, but this group of species is made up of plants otherwise found in the forests of northern Chihuahua and adjoining Arizona. Since other species show absolutely no evidence of direct floristic connections between the Sierra Madera and the El Salto area, far away in the Sierra Madre Occidental in southwestern Durango,

this fact lends additional support to the belief that the *Abies* of Coahuila and Durango are different.

The precise relationships of *A. coahuilensis* are not certain. Among the Mexican species it is probably most closely related to the undescribed plant of Durango. It is readily distinguished from *A. religiosa* of central Mexico by its non-exserted cone-bracts, proportionately shorter cone-scales, smaller seeds, and markedly bisulcate leaves. In many ways, however, it shows closer relationships with *A. concolor* and *A. grandis*, of the western United States. From the former it differs in its slender brownish hispidulous twigs, more slender green bisulcate leaves, and few or absent stomates on the upper leaf-surface. Its hispidulous twigs, more slender acutish leaves, not markedly glaucous beneath, and proportionately broader cone-scales readily separate *A. coahuilensis* from *A. grandis*.

TAXODIACEAE

Taxodium mucronatum Ten. Ann. Sci. Nat. III. 9: 355 (1853).

VERNACULAR NAME: Sabino.

COAHUILA: Hac. Mariposa, Wynd 694; Muzquiz, Sabinas River, Marsh 406; Sabinas, along Sabinas River, Johnston 7040; Villa Juarez, Marsh 2084.

Reported in wet places near Parras, Fedde Repert. Spec. Nov. 14: 100 (1915). To be expected also along the Rio Nazas west of Torreon.

CUPRESSACEAE

Cupressus arizonica Greene, Bull. Torr. Bot. Cl. 9: 64 (1882).

VERNACULAR NAMES: Cedro; Pinabeta; Tasco.

COAHUILA: Sierra del Carmen, Cañon Sentenela, Wynd & Mueller 502; Sierra Madera, Muller 3193, Johnston 8925; mountains near Saltillo, Pringle 13612; Carneros area, 1880, Palmer 1293; Sierra Encarnacion, Nelson 3894a; sierras 24 km. northwest of Fraile, Stanford et al. 383; Sierra Parras, Purpus 4987. CHIHUAHUA: Sierra Rica, Cañon Madera, Stewart 2464 and 2479; Sierra Santa Eulalia, Pringle 178.

This species ranges from Texas (Chisos Mts.) and Arizona south to Zacatecas and San Luis Potosi. It appears to differ from *C. Benthami*, of central Mexico, in its larger and more leathery cones and somewhat coarser usually paler foliage. In the Sierra Madera I found this cypress common in the luxuriant coniferous forests on north slopes, where it grew with *Pinus Ayacahuite* and *Pseudotsuga taxifolia* and formed straight single trunks, commonly attaining 20–30 m. in height. About the lower edge of the conifer-belt it was occasional along arroyos associated with *Pinus arizonica*. In such situations it rarely reached 10 m. in height and was broadly conical in form. The younger branches are smooth and brown. The trunks of younger trees have irregular furrows in the thick persistent laminated old bark. The tall trees in the dense forest have a tight checkered bark. Mr. Stewart reports that the tree was common on Sierra Rica along the shady bottom of Cañon de la Madera and there formed a tree rarely up to 20 m. tall with a trunk 12 dm. thick. In that locality it was locally called "Pinabeta." Two of Mr. Marsh's collections, nos. 803 and 1999, from the Sierra del Carmen and Sierra Gloria, are sterile but seem to represent this species.

Juniperus pachyphloea Torr. U. S. Rep. Explor. Miss. Pacif. 4: 142 (1857).

VERNACULAR NAMES: Cedro; Tascate.

COAHUILA: Sierra del Carmen, Cañon Sentenela, *Wynd & Mueller* 535; west of Buena Vista Ranch [?Sierra Encantada], *Marsh* 1359 and 2296; Sierra del Pino, common in pine forest, *Johnston & Muller* 528, *Stewart* 2294, 2295; Carneros Pass area, March 1880, *Palmer* 1296. CHIHUAHUA: Sierra Rica, Cañon Madera, scarce on open slopes, *Stewart* 2549.

The above-cited specimens, agreeing with most Texan collections, have resin exuding from only a few scattered leaves or from none at all. Otherwise the plant agrees well with the "Alligator Juniper" of Arizona and New Mexico, the type of which came from the Zuni Mts. in western New Mexico. It is a large tree with heavy trunk covered with characteristic checkered bark. It is closely related to *J. Deppeana* Steud. (based on *J. mexicana* C. & S., not Spreng.), a Mexican tree, also with checkered bark, growing in the states of Vera Cruz, Puebla, and Hidalgo, and apparently also in Zacatecas, Durango, Chihuahua, and Sonora, which differs slightly in the less conspicuous resin-glands on its smoother less prominently keeled leaves. In *J. pachyphloea* the leaves are usually sulcate on either side of the gland and consequently appear to be three-ridged. Only in Sonora and Chihuahua do the ranges of *J. Deppeana* and *J. pachyphloea* appear to approach one another. The type of *J. Deppeana* came from the margin of the plateau in western parts of Vera Cruz, between Las Vigas and Perote, northwest of Jalapa and north of Cofre de Perote. Curiously it does not appear to have extended its range northward into the Sierra Madre of Nuevo Leon or Tamaulipas.

Juniperus flaccida Schlechtend. Linnaea 12: 492 (1938).

VERNACULAR NAMES: Tascate; Cedro.

COAHUILA: Sierra del Carmen, Sept. 7, 1936, *Marsh* 794; Sierra San Manuel, Rancho Agua Dulce, *Wynd & Mueller* 359; Sierra del Carmen, 8 km. east of Hac. Encantada, *Stewart* 1585; Hillcoat Mesa, west of Hac. Encantada, *Marsh* 1425; Mesa Grande, 40 km. northwest of Hac. Encantada, *Stewart* 1617; Sierra Encantada, *Stewart* 1424; west of Rancho Buena Vista [?Sierra Encantada], *Marsh* 1360; Sierra del Pino, *Johnston & Muller* 527, *Stewart* 1824; Sierra Gloria, *Marsh* 1972; Sierra Madera, *Muller* 3209, *Johnston* 8936; Sierra Mojada, *Stewart* 1058; mountains near Saltillo, *Gregg* 432; Carneros area, *Pringle* 2294, *Palmer* 1294 and 1295; mountains 24 km. northwest of Fraile, *Stanford et al.* 390; General Cepeda, *Nelson* 6122; Sierra Pata Galana, *Purpus* 1105; Sierras Negras, 9 km. south of Parras, *Stanford et al.* 222; Sierra Jimulco, 11 km. northeast of Jimulco, *Stanford et al.* 133. CHIHUAHUA: Sierra Almagre, *Johnston & Muller* 1176; Sierra Diablo, *Stewart* 942.

Ranging from central Mexico (the type came from the mountains of Hidalgo), this tree extends northward into the Sierra Madre of Chihuahua and through our area into the Chisos and Davis Mountains of Texas. The leaves are decussate and the branchlets are distichous, making the leafy branchlets flat and more or less fan-like. The conspicuously two-ranked smooth elongate acute cuspidate leaves, the pendulous ("weeping") leafy branchlets, and the large resinous multi-seeded non-baccate fruits all unite in permitting the ready recognition of the species. It is a tree with reddish fibrous bark. In our area it commonly becomes 4-8 m. tall and appears

to favor limestone. It grows scattered on slopes or more commonly along arroyo-banks, in sheltered places in the oak and lower pine belt.

Juniperus Ashei Buchholz, Bot. Gaz. **90**: 329 (1930).

Juniperus occidentalis var. *conjungens* Engelm. Trans. Acad. Sci. St. Louis **3**: 590 (1877).

Juniperus tetragona var. *oligosperma* Engelm. l. c. 591.

COAHUILA: Saltillo, frequent in highlands, shrub 5–10 ft., *Gregg 106* (isotype of var. *conjungens*); escarpment near mines, Potrero de la Mula, tree 12 ft., *Johnston 9195*; Sierra San Manuel near Rancho Agua Dulce, *Wynd & Mueller 360*; near Puerto Santa Anna, Hac. Mariposa, *Wynd & Mueller 284*.

This is the well known "cedar" of the Edwards Plateau of central Texas, which has passed as *J. sabinooides*, *J. mexicana*, and *J. tetragona*. These names, however, properly apply to very different species of southern and central Mexico. From our area the species extends north into central Texas and from thence to Missouri. Under the name *J. mexicana*, its distribution in the United States has been discussed by Hopkins, *Rhodora 40*: 425 (1938). It forms a small tree and has dark blue globose berries about 8 mm. in diameter.

Juniperus erythrocarpa Cory, *Rhodora 38*: 186 (1936).

VERNACULAR NAME: Tascate.

COAHUILA: Sierra Hechiceros, common along canyons, *Johnston & Muller 1290*, *Stewart 168* and *169*; Castillon, one tree on gypsum flat by corrals, *Johnston & Muller 1273*; Sierra del Pino, La Noria, frequent on flats at lower edge of pine-belt, *Johnston & Muller 525* and *526*; Sierra Cruces, arroyo 3 mi. southwest of Santa Elena, *Johnston & Muller 824*; Sierra Almagre, on flats, *Johnston & Muller 1160*; Sierra Madera, Charretera Canyon, 3 bushes on flat at lower edge of pine-belt, *Johnston 9114*. CHIHUAHUA: Sierra Rica, Cañon Madera, scarce on dry slopes, *Stewart 2483*; near Rancho El Pino, southeast of Sierra Rica, frequent, *Stewart 2426* and *2574*; low hills 13 mi. west of San Carlos, *Johnston & Muller 28*.

Forming a dense rounded bush 10–15 dm. tall or a tree up to 6 m. high. The fruit is not blue, but at maturity it is brownish or reddish, juicy, and commonly about 8 mm. in diameter. Berries with the seed more or less exposed are very common. Submature fruits are usually ovoid. This plant occurs in the Chisos, Chinati, and Davis Mountains of trans-Pecos Texas. I believe the type of *J. erythrocarpa*, from the Chisos Mts., is a form of this species collected late in the season, with the berries large, perhaps because they are fully developed. Mr. Cory, who formerly treated this species as *J. gymnocarpa*, is not satisfied that I am correct in identifying it with the plants he described as *J. erythrocarpa*. If his suspicions are correct our plant is without a name, for the name *J. gymnocarpa* (Lemmon) Cory is based upon a phase of true *J. monosperma* from the Sandia Mts., New Mexico.

Juniperus monosperma (Engelm.) Sargent, *Silva No. Am. 10*: 89 (1896).

COAHUILA: Carneros Pass, *Pringle 2305*; Sierra Parras, *Purpus 1104*; Sierra Negras, 9 km. south of Parras, *Stanford et al. 150*. CHIHUAHUA: Sierra Santa Eulalia, *Pringle 710*. ZACATECAS: Near Picachos de las Bocas, 20 mi. S.W. of Concepcion del Oro, *Shreve 9374*; Cedros, *Kirkwood 146*.

In its typical form *J. monosperma* ranges in New Mexico and into adjoining Arizona and Colorado. It has coppery bluish immature fruits, which

on maturity form a coppery-blue distinctly fleshy berry with a single plump seed. The old dried fruits are raisin-like. They are usually glaucous and, though blue, have a reddish tone that is very conspicuous if compared with the blackish blue mature berries of *J. Ashei*. The Mexican material I have cited is not typical *J. monosperma* and belongs to a group of unnamed forms, obviously closely related to *J. monosperma*, which occur in western Oklahoma, trans-Pecos Texas, Sierra Madre of western Chihuahua south into Durango, and in our area. The collections from Santa Eulalia Mts., from near Parras, and from Picachos de las Bocas have glaucescent foliage. The material from near Carneros has yellowish green non-glaucous foliage very suggestive of *J. erythrocarpa*. Possibly it was subjected to excessive heat in drying and the waxy bloom destroyed. Its fruit seems to agree well enough with the other forms of *J. monosperma* that I have here associated with it.

EPHEDRACEAE

Ephedra trifurca Torr. ex Wats. Bot. King Exped. 329 (1871).

VERNACULAR NAME: Hitomorial.

COAHUILA: Sierra del Carmen, Aug. 29, 1936, *Marsh 694*; gypsum ridge east of Laguna Jaco, *Johnston & Muller 1076*; 21 mi. west of El Oro, road to Guimbaleté, *White 2010*; Laguna del Rey, gypsum on plain, *Stewart 3015*. CHIHUAHUA: 10 mi. south of Ojinaga, clays, *Johnston & Muller 13*; vicinity of Chihuahua, 1908, *Palmer 68*, *Pringle 868*; 12 mi. south of Camargo, *White 2233*.

A bush 10–15 dm. tall with a loose broom-like habit, ranging from trans-Pecos Texas to Arizona and south into adjoining Mexico. In Coahuila the plant is frequent on gypsum and on gypseous clays. During my several visits in Mexico, between July and October, I have never found a fruiting plant. The plant is easily distinguished in our area by having its leaves 3 at a node, elongate, persistent, and becoming shredded in age, by its coarse branches, and by its pungent terminal bud. This species and *E. Torreyana* have the scales of the cones dry and papery.

Ephedra Torreyana Wats. Proc. Am. Acad. 14: 299 (1879).

CHIHUAHUA: 10 mi. south of Ojinaga, clays, a gray-green bush 1–2 ft. tall, *Johnston & Muller 14*.

This species probably occurs in the valley of the Rio Grande between Ojinaga and El Paso. It has been collected from western Texas to Arizona and Utah, frequently in gypseous soils. It is a small bush with slender widely divergent branchlets and short spreading ternate leaves.

Ephedra aspera Engelm. ex Wats. Proc. Am. Acad. 18: 157 (1883).

VERNACULAR NAMES: Popotillo; Cañutilla; Pitamoreal; Hintimoreal.

COAHUILA: El Berrendo, *White 1800*; Puerto San Lazaro, *Wynd & Mueller 143*; La Rosa, *Shreve & Tinkham 9588*; Saltillo, 1898, *Palmer 69*; Carneros area, 1880, *Palmer 1288* (TYPE); low hills 10 mi. south of Picachos Colorados, *Johnston & Muller 152* and *154*; Sierra del Pino, La Noria, *Johnston & Muller 474*, *Stewart 1191*; Santa Elena, Sierra Cruces, *Stewart 2228*, *2254*, *2255*; western base of Picacho del Fuste, *Johnston 8452*; 3 km. southwest of Fraile, *Stanford et al. 338*; west of Castanuela, April 11, 1847, *Gregg 414*; Sierra Parras, March 1905, *Purpus 1102*; Sierras Negras, 9 km. south of Parras, *Stanford et al. 168*. CHIHUAHUA: Sierra San Carlos near the mines, *Johnston & Muller 60*; Santa Eulalia plain, *Wilkinson 118*; crest of Santa

Eulalia Mts., *Pringle* 38. ZACATECAS: 15 km. west of Concepcion del Oro, *Stanford et al.* 521; Cedros, *Kirkwood* 24, *Kirkwood & Lloyd* 86.

This is the common *Ephedra* on rocky limestone slopes in Coahuila. Commonly a bush 8–10 dm. tall, with leaves opposite and cone-scales thick but not fleshy. The species ranges in southern New Mexico and trans-Pecos Texas south on the plateau to San Luis Potosi.

Ephedra pedunculata Engelm. ex Wats. Proc. Am. Acad. **18**: 157 (1881).

VERNACULAR NAMES: Comida del Vibora; Popotillo; Tepopote; Canatilla; Sanguinaria; Retamo Real; Hintimoreal; Itamoreal; Pitamoreal.

COAHUILA: Villa Juarez, 1880, *Palmer* 1290; Cañon de Jara, west of Cuatro Cienegas, *Johnston* 8837, 8841, 8847; Cuatro Cienegas, *Marsh* 2057; Sierra Gavia, 5 mi. north of Saucillo, *Johnston* 7220; Saltillo, 1880, *Palmer* 1289; Saltillo, 1898, *Palmer* 283; Valle de los Guajes, 8 km. east of Puerto del Aire, *Stewart* 1319; Santa Elena, Sierra Cruces, *Stewart* 2265 and 2266; Sierra Cruces, Cañon Tinaja Blanca, *Johnston & Muller* 310; La Botica, limestone slope, *Stewart* 2939. CHIHUAHUA: Santa Eulalia plain, *Wilkinson* 117 in pt.; Bachimba Canyon, *Pringle* 134. ZACATECAS: Cedros, *Lloyd* 75 and 214; near Concepcion del Oro, 1902, *Palmer* 372. DURANGO: Between Mapimi and Jimenez, Apr. 18, 1867, *Gregg* 484 (Mo).

Usually scrambling up through bushes and frequently reaching a height of 3 or 4 meters. Its branches cascade over the top of the supporting vegetation and become very conspicuous when covered with an abundance of red juicy fruits. At Ocampo it is very common in the hedge rows about the town. The plant is not always lofty. In Cañon de Jara, on very arid cemented gravels, I observed plants of this species forming depressed mats a meter broad and scarcely a decimeter high. Even with this unusual habit the species was readily recognized by its pedunculate fleshy red cones.

Ephedra compacta Rose, Contr. U. S. Nat. Herb. **12**: 261 (1909).

VERNACULAR NAME: Hitamo Real.

COAHUILA: Battlefield near Buena Vista, rocky soil, May 19, 1848, *Gregg* 53; Sierras Negras, 9 km. south of Parras, *Stanford et al.* 169a; Sierra Jimulco, 11 km. northeast of Jimulco, *Stanford et al.* 34.

A depressed spreading grayish bush usually less than 5 dm. tall. The species is known from the States of Coahuila, San Luis Potosi, Puebla, and Oaxaca. It has opposite leaves and a sessile cone that produces two seeds and becomes red and fleshy at maturity.

Ephedra antisiphilitica Berl. ex C. A. Mey. Mém. Acad. Sci. St. Pétersb. VI. Sci. Nat. **5**: 291 (1846).

To be expected in northeastern Coahuila. Widely distributed in Texas and collected near the Rio Grande at various points between Laredo and the Big Bend. A bush becoming a meter tall, with opposite leaves and a sessile, single-seeded fleshy red cone.

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